

JVC

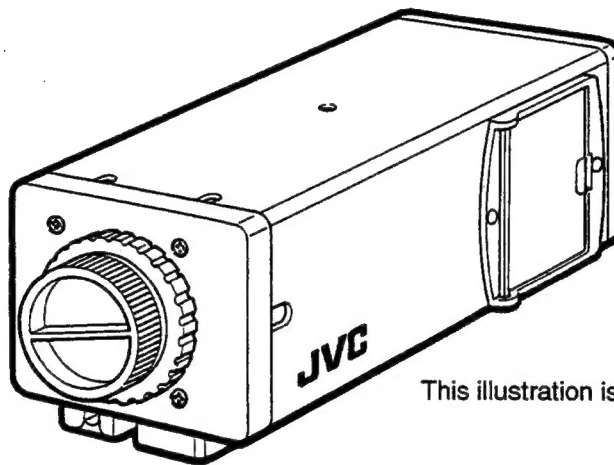
SERVICE MANUAL

COLOR VIDEO CAMERA HEAD

TK-1280E/TK-1180E/TK-1281EG

BASIC CHASSIS

YU



This illustration is Model TK-1280.

NOTE:

This service manual is for TK-1280E assembled in Hachioji factory.

For the unit assembled in Iwai factory, see service manual number 50716.

The serial numbers

from 09852451 and after

Hachioji

from 10710001 to 09852450

Iwai

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INSTRUCTIONS

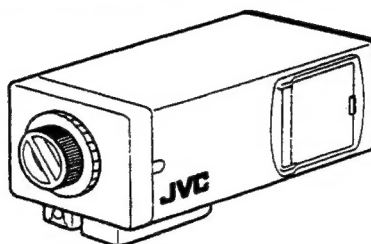
JVC

TK-1180E

COLOUR VIDEO CAMERA HEAD

BEDIENUNGSANLEITUNG: FARB-VIDEOKAMERAKOPF

MANUEL D'INSTRUCTIONS: TÊTE DE CAMERA VIDEO COULEUR



TK-1280E instructions see the
TK-1280E service manual No. 50716.

INSTRUCTIONS

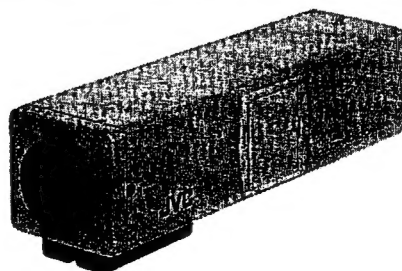
JVC

TK-1281EG

COLOUR VIDEO CAMERA

BEDIENUNGSANLEITUNG: FARB-VIDEOKAMERA

MANUEL D'INSTRUCTIONS: CAMERA VIDEO COULEUR



WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION:

To prevent electric shock, do not open the unit. No user serviceable parts inside. Refer servicing to qualified service personnel.

CAUTION:

To prevent electric shocks and risk of fire hazards, do NOT use other than the specified power source.

This installation should be made by a qualified service person and should conform to all local codes.

Thank you for purchasing a JVC colour video camera head. To obtain the best results from your new camera, read this instruction manual carefully before use; retain the manual for future reference.

This instruction manual is divided into three sections: English, German, French.

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WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

**WARNING—THIS APPLIANCE MUST
BE EARTHED
IMPORTANT**

The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW:	EARTH
BLUE:	NEUTRAL
BROWN:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol \perp or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

Thank you for purchasing a JVC colour video camera.

To obtain the best results from your new camera, read this instruction manual carefully before use; retain the manual for future reference.

This instruction manual is divided into three sections: English, German, French.

English	Page 2 - 22
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FEATURES

- CCD IRIS function to automatically set the brightness of the picture by changing the shutter speed of the camera according to the light incident when using a manual iris lens.
- AGC (Automatic Gain Control) function to automatically increase camera's sensitivity when the level of ambient light drops.
- Built-in back-light compensation function
- Either the galvanometric auto-iris lens or the video-level-sensing auto-iris lens can be used.
- TTL (Through-The-Lens) auto tracking white balance adjustment with preset luminous intensity (☉) and manual override (2 axes; G-Mg and R-B)
- Changeable C/CS lens mount allows selection from a wide range of lenses.
- Gen-lock and line-lock functions are provided.
- Built-in electronic shutter to allow switching to 9 shutter speeds.
- Convenient external flange-back adjustment function allows adjustment using a screwdriver.
- Compact, light-weight design greatly reduces the space required for installation.
- AC or DC operation.

PRECAUTIONS (USE)

When operation is incorrect or a malfunction is observed:

While operation, if any abnormal condition (strange sound, smell or smoke) or a malfunction (no picture, etc.) is observed, stop using the camera immediately, turn the power off, then call your local dealer.

Cleaning

Turn the power off and wipe off the dirt with a dry soft cloth. If it is extremely dirty, use furniture cleaner to wipe it off.

To clean the lens, use a blower of lens cleaning tissue (available from any camera dealer).

- **Do not point the camera at the sun.** This could damage the camera whether it is operating or not.
- **Do not shoot any source of bright light.** If the object contains very bright areas, bright vertical or horizontal lines may appear on the screen. This is called "smear", a phenomenon which often occurs with solid-state pickups, and is not a malfunction.
- **Do not disassemble the camera** and never touch parts inside the camera as you could damage the camera.
- **Do not allow anything to get inside the camera.** If a metal or flammable object gets inside the camera, it may cause a malfunction.
- **Handle with care.** Do not drop the camera or subject it to shocks and vibrations to avoid possible damage.

*Also read "Precautions (installation)" on page 21 carefully.

3

FEATURES

- Automatic Electronic Shutter function to automatically set the brightness of the picture by changing the shutter speed of the camera according to the light incident when using a manual iris lens.
- AGC (Automatic Gain Control) function to automatically increase camera's sensitivity when the level of ambient light drops.
- Built-in back-light compensation function
- Either the galvanometric auto-iris lens or the video-level-sensing auto-iris lens can be used.
- TTL (Through-The-Lens) auto tracking white balance adjustment with preset luminous intensity (☉) and manual override (2 axes; G-Mg and R-B)
- Changeable C/CS lens mount allows selection from a wide range of lenses.
- Gen-lock and line-lock functions are provided.
- Built-in electronic shutter to allow switching to 9 shutter speeds.
- Convenient external flange-back adjustment function allows adjustment using a screwdriver.
- Separated Y/C video signal output connector.
- 220 – 240 V AC operation.

PRECAUTIONS (USE)

When operation is incorrect or a malfunction is observed:

While operation, if any abnormal condition (strange sound, smell or smoke) or a malfunction (no picture, etc.) is observed, stop using the camera immediately, turn the power off, then call your local dealer.

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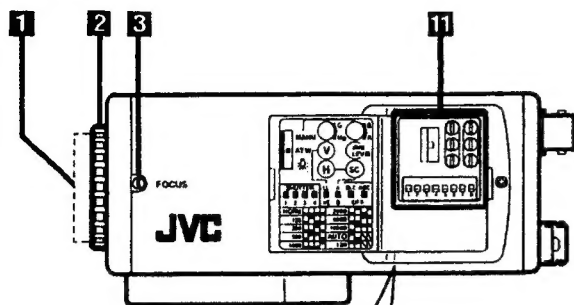
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- **Handle with care.** Do not drop the camera or subject it to shocks and vibrations to avoid possible damage.

*Also read "PRECAUTIONS (INSTALLATION)" on page 20 carefully.

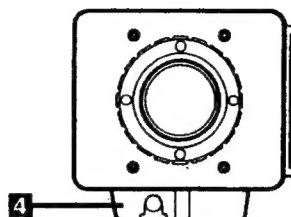
3

CONTROLS AND THEIR LOCATIONS

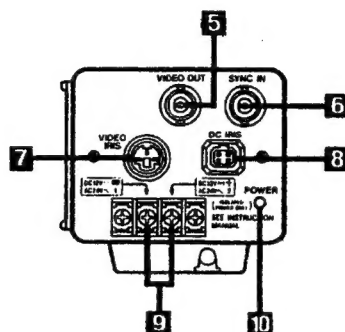
Side view



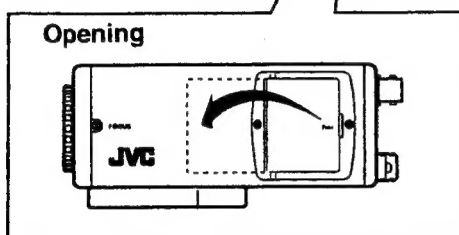
Front view



Rear view

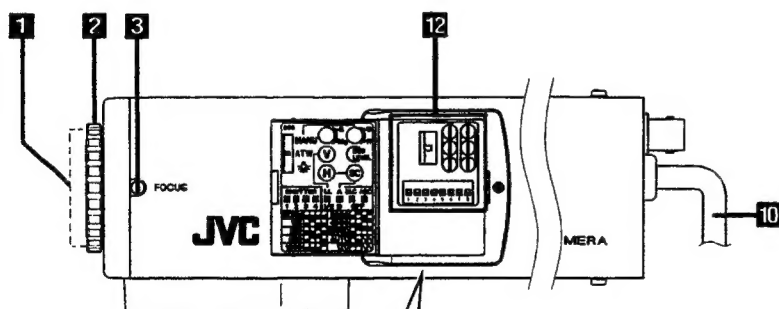


Opening

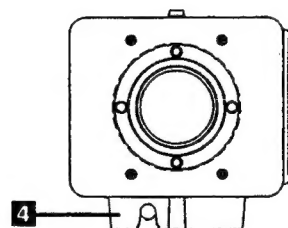


CONTROLS AND THEIR LOCATIONS

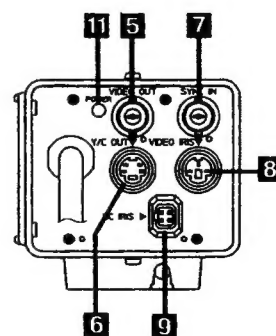
Side view



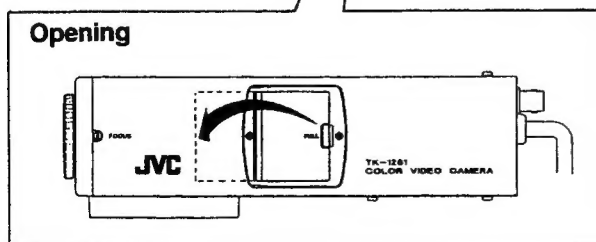
Front view



Rear view



Opening



1 Lens mount cap

Be sure to cap the lens mount when the lens is not mounted. Turn counterclockwise to remove.

2 C-mount adapter

To mount a C-mount lens a C-mount adapter is provided. To mount a CS-mount lens, remove the C-mount adapter. Any lens for 1/3", 1/2", 2/3" or 1" video camera can be used. Turn clockwise to remove it. Also refer to page 15.

3 FOCUS screw

A screw is provided to adjust and fix the flange-back (the distance from the lens mounting to the focal point). See page 16.

4 Tripod mounting base

This is the mounting base for installing the camera. See page 14 and 20.

5 VIDEO OUT connector

BNC connector that outputs a composite video signal. Connect to the video input connector of a monitor, switcher, etc.

- Use a coaxial cable for connection.

5

1 Lens mount cap

Be sure to cap the lens mount when the lens is not mounted. Turn counterclockwise to remove.

2 C-mount adapter

A C-mount adapter is provided to mount a C-mount lens. When mount a CS-mount lens, remove the C-mount adapter at first. Any lens for 1/2", 2/3" or 1" video camera can be used. Then, turn clockwise it. Also refer to page 14.

3 FOCUS screw

A screw is provided to adjust and fix the flange-back (the distance from the lens mounting to the focal point). See page 15.

4 Tripod mounting base

This is the mounting base for installing the camera. See page 13 and 19.

5 VIDEO OUT connector

BNC connector that outputs a composite video signal. Connect to the video input connector of a monitor, switcher, etc.

- Use a coaxial cable for connection.

6 Y/C OUT connector

Output connector for separated Y/C video signals. Connect to the S-VIDEO input connector of a video monitor, etc. If the plug on the cable is of a different type, replace it with the provided 4-pin plug.

Pin assignment: Y/C OUT connector (4-pin)

Pin No.	Signal
1	GND
2	GND
3	Y (Luminance, 1 Vp-p, 75 ohms)
4	C (Chrominance, 0.3 Vp-p (burst), 75 ohms)

5

6 SYNC IN connector

- BNC connector for external sync reference signal input such as composite video signal (VBS) or black burst signal (BB).
- Connect to the connector outputting the signal to be used as a reference for external sync.
- Use a coaxial cable for connection.
- When the sync reference signal is input, the camera automatically switches from the internal to external sync mode to perform gen-lock operation.

Caution:

- Before performing gen-lock operation with the external sync signal input, make sure to set the sync mode switch to "I/E" position. (See page 12.)
- When an external H/V sync signal is input, the camera automatically switches to H/V lock mode when the sync mode switch is set in LL position. (See page 12.)

Notes:

- If the external sync signal to be input is less than -4dB with respect to the reference level, sync operation is not possible.

Reference level	Composite video signal (VBS)	1.0 Vp-p*
	Black burst signal (BB)	0.45 Vp-p

* The video components of the signal do not matter.

- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- When gen-lock operation is performed, adjustment of horizontal phase and colour sub-carrier phase are required. (See page 13.)

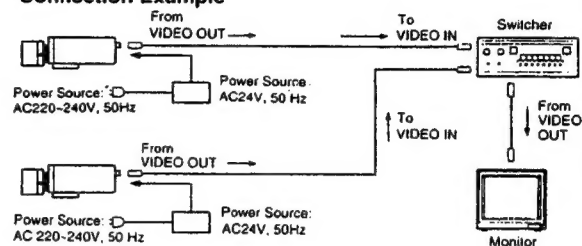
Connections for line-lock operation

- Set the sync mode switch to LL position. (See page 12.)
- When performing line-lock operation, the V phase adjustment is required. (See page 13.)

Caution:

- Do not input the external sync signal to the SYNC IN connector.

Connection Example



7 SYNC IN connector

- BNC connector for external sync reference signal input such as composite video signal (VBS) or black burst signal (BB).
- Connect to the connector outputting the signal to be used as a reference for external sync.
- Use a coaxial cable for connection.
- When the sync reference signal is input, the camera automatically switches from the internal to external sync mode to perform gen-lock operation.

Caution:

- Before performing gen-lock operation with the external sync signal input, make sure to set the sync mode switch to "I/E" position. (See page 11.)
- When an external H/V sync signal is input, the camera automatically switches to H/V lock mode when the sync mode switch is set in LL position. (See page 11.)

Notes:

- If the external sync signal to be input is less than -4dB with respect to the reference level, sync operation is not possible.

Reference level	Composite video signal (VBS)	1.0 Vp-p*
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- When gen-lock operation is performed, adjustment of horizontal phase and colour sub-carrier phase are required. (See page 12.)

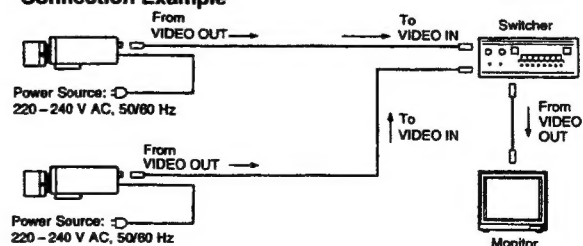
Connections for line-lock operation

- Set the sync mode switch to LL position. (See page 11.)
- When performing line-lock operation, the V phase adjustment is required. (See page 12.)

Caution:

- Do not input the external sync signal to the SYNC IN connector.

Connection Example



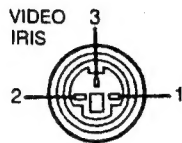
7 VIDEO IRIS connector

Connect the iris cable of an video-level-sensing auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 3-pin iris plug.

Note:

- Use video-level-sensing auto-iris lens using DC 9V - 10V with power consumption of 50 mA or less.

Pin assignment: VIDEO IRIS connector (3-pin)

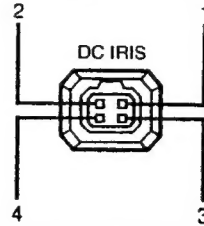


Pin No.	Signal
1	GND
2	Video (0.7 Vp-p high impedance, no sync)
3	DC 9V-10V (50 mA max.)

8 DC IRIS connector

Connect the iris cable of the galvanometric auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 4-pin iris plug.

Pin assignment: DC IRIS connector (4-pin)



Pin No.	Signal
1	Control (-)
2	Control (+)
3	Drive (+)
4	Drive (-)

7

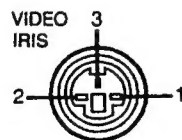
8 VIDEO IRIS connector

Connect the iris cable of an video-level-sensing auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 3-pin iris plug.

Note:

- Use video-level-sensing auto-iris lens using DC 9 V - 10 V with power consumption of 50 mA or less.

Pin assignment: VIDEO IRIS connector (3-pin)

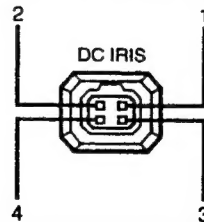


Pin No.	Signal
1	GND
2	Video (0.7 Vp-p high impedance, no sync)
3	DC 9V-10V (50 mA max.)

9 DC IRIS connector

Connect the iris cable of the galvanometric auto-iris lens. If the plug on the cable is of a different type, replace it with the provided 4-pin plug.

Pin assignment: DC IRIS connector (4-pin)



Pin No.	Signal
1	Control (-)
2	Control (+)
3	Drive (+)
4	Drive (-)

10 Power cord

Supply power from an AC outlet (220 to 240 V).

Caution:

- Be sure not to connect the power source until all other connections are complete. Do not turn the power of any equipment on until connections are completed.

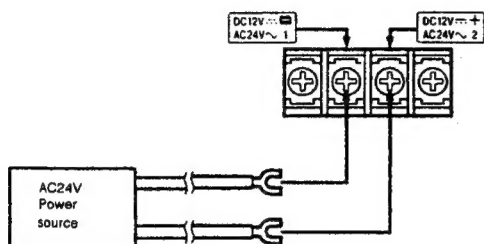
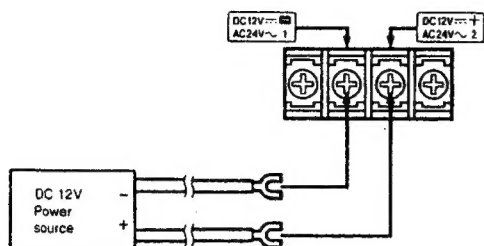
11 POWER indicator

Lights when the camera is powered.

7

9 Power input terminal (12V \equiv /24 V \sim)

Connect to a DC 12 V or AC 24 V power source. When DC 12 V power is to be supplied from an AC 220 V to 240 V power source, use the optional AC adapter AC-C624 (for the U.K.) or AC-C622 (for countries other than the U.K.). When operating with an AC 24 V power supply, use only an isolated power source.



Caution:

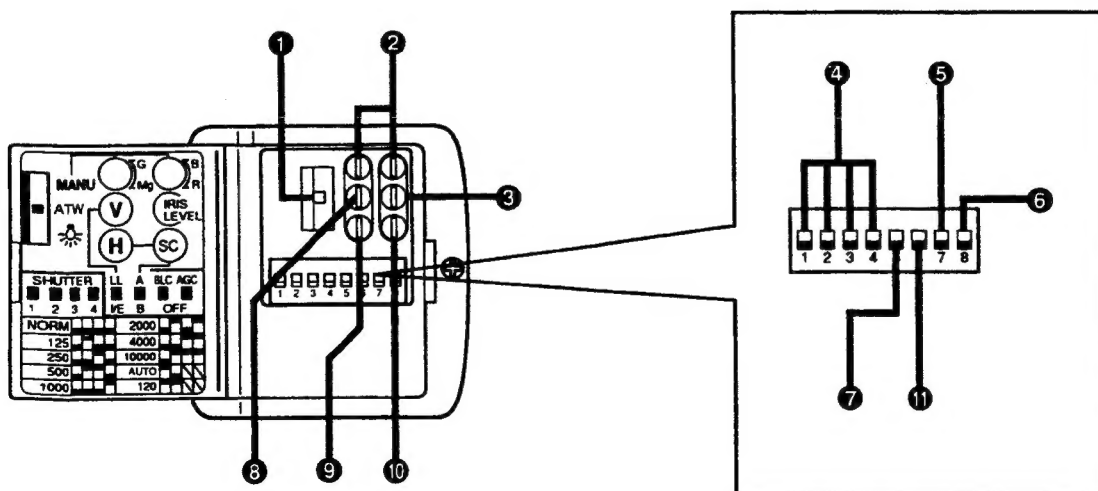
- Be sure not to connect the power source until all other connections are complete. Do not turn the power of any equipment on until connections are completed.
- The power voltage is specified as DC 12 V or AC 24 V.
- Be careful to connect the DC 12 V power supply, with the correct +/− polarity.
- Use a DC 12V power source with ripple voltage of less than 50 mV.
- Do not power the unit with both AC 24 V and DC 12 V at the same time. Be sure to connect only one power source.

10 POWER indicator

Lights when the camera is powered.

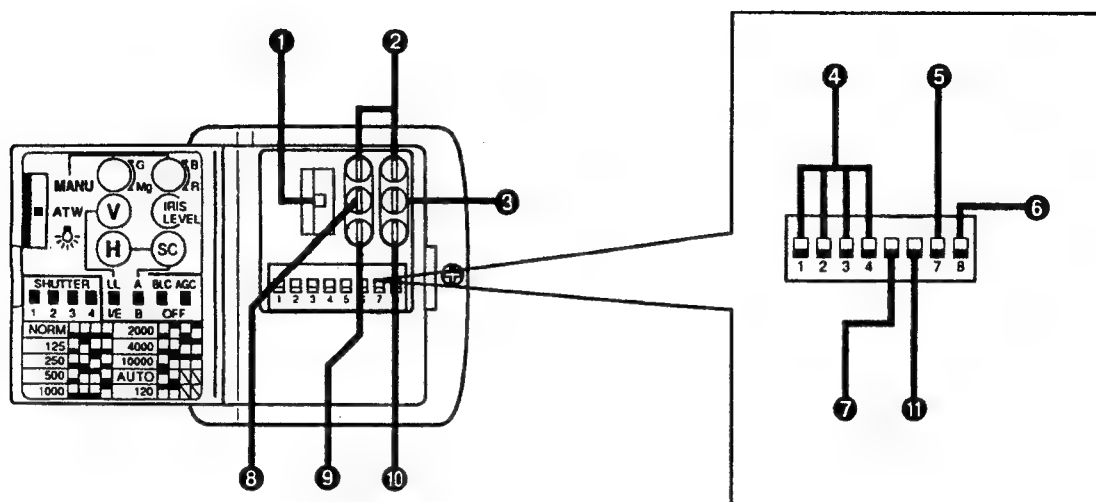
12 Picture adjustment section

AGC, BLC, Shutter mode, IRIS LEVEL, Sync mode, H/V phase, SC phase and White balance controls are provided. Perform the following adjustments and settings according to the shooting (or lighting) conditions.



11 Picture adjustment section

AGC, BLC, shutter speed, IRIS LEVEL, sync mode, H/V phase, SC phase and white balance controls are provided. Perform the following adjustments and settings according to the shooting (or lighting) conditions.



9

1 White balance adjustment switch

This is used for changing the setting of the white balance.

MANU: Manual adjustment is possible.

ATW: Accepts different types of lighting (colour temperatures ranging from approx. 2850 K to 7000 K) using an automatic tracing system. (TK-1281EG uses a TTL system that measures light entering the camera lens.)

: For shooting under the artificial light such as halogen lamps (colour temperature approx. 3200 K).

Notes:

- When using the camera under a fluorescence light with high shutter speed, the white balance may change periodically.
- The automatic tracing system may not function properly when shooting with non-standard lighting or lighting with a colour temperature that exceeds the range of the camera. Because it uses a TTL system, if a coloured object is shot (especially one with a single colour) that fills most of the camera's field of view, the colour temperature may be judged incorrectly and the correct white balance adjustment may not be possible. In such a case, set to the "MANU" position.

2 White balance adjustment controls

When the white balance adjustment switch is set to "MANU", the white balance can be adjusted manually.

G-Mg: Turn to the "G" side to increase the amount of green in the picture. Turn to the "Mg" side to increase the amount of magenta.

B-R: Turn to the "B" side to increase the amount of blue. Turn to the "R" side to increase the amount of red.

3 IRIS LEVEL control

The brightness control of the monitor picture does not operate correctly, adjust using this control. Turn OFF the AGC switch (set to ON at the factory) to adjust the IRIS LEVEL control.

Monitor picture	Adjustment direction
To make it brighter	Turn clockwise.
To make it darker	Turn counterclockwise.

Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric auto-iris lens or the video-level-sensing auto-iris lens.
- Be careful not to turn the IRIS LEVEL control beyond its limits as this could cause a malfunction in the camera's auto-iris control.

9

① White balance adjustment switch

This is used for changing the setting of the white balance.

MANU: Manual adjustment is possible.

ATW: Accepts different types of lighting (colour temperatures ranging from approx. 2850 K to 7000 K) using an automatic tracing system.

(TK-1180E uses a TTL system that measures light entering the camera lens.)

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Notes:

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② White balance adjustment controls

When the white balance adjustment switch is set to "MANU", the white balance can be adjusted manually.

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Monitor picture	Adjustment direction
To make it brighter	Turn clockwise.
To make it darker	Turn counterclockwise.









































Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric-iris lens or the video-iris lens.
- Be careful not to turn the IRIS LEVEL control beyond its limits as this could cause a malfunction in the camera's auto-iris control.

④ SHUTTER mode select switch

This varies the shutter speed (the time the change is stored). Normally, when a fast-moving object is being shot, still or slow-motion played back pictures will be blurred. In this case, switching the shutter speed from the normal speed of 1/50 second to a faster speed allows each frame to be recorded with greater detail, at the higher speed.

When using a manual iris lens, the brightness of the picture image will be fixed by setting this switch in AUTO (Automatic electronic shutter) position, as the shutter speed is automatically varied according to the light incident.

Switch position	Shutter speed
NORM    	1/50 second Normally, set to this position.
120     (Switches No. 3 and 4 can be set either in upper or lower position)	1/120 second
125    	1/125 second
250    	1/250 second
500    	1/500 second
1000    	1/1000 second
2000    	1/2000 second
4000    	1/4000 second
10000    	1/10000 second
AUTO     (Switches No. 3 and 4 can be set either in upper or lower position.)	Automatic electronic shutter function (Do not set this switch in this position when using an auto-iris lens.)

Caution:









































- The automatic electronic shutter function is not activated for a light object to be shot, such as in outdoor condition. In such a case, use the camera with the auto-iris or manual-iris.

Notes:

- Faster shutter speeds require more light than the normal speed. (In the 1000 mode, the sensitivity is approx. 1/20 that at normal speed; in the 10000 mode, approx. 1/200.)
- When shooting with the faster shutter speed, or when a light object is being shot by setting in AUTO position (the shutter speed becomes faster), the brightness and white balance may change periodically. Shooting with artificial lighting (especially fluorescent lights) will cause the pictures to flicker. Smear (bright horizontal or vertical lines) which can often be seen with solid-state pickups may appear in the picture.

④ SHUTTER mode select switch

This varies the shutter speed (the time the charge is stored). Normally, when a fast-moving object is being shot, still or slow-motion played back pictures will be blurred. In this case, switching the shutter speed from the normal speed of 1/50 second to a faster speed allows each frame to be recorded with greater detail, at the higher speed. When using a manual iris lens, the brightness of the picture image will be fixed by setting this switch in AUTO (CCD iris) position, as the shutter speed is automatically varied according to the light incident.

Switch position	Shutter speed
NORM    	1/50 second Normally, set to this position.
120     (Switches No. 3 and 4 can be set either in upper or lower position)	1/120 second
125    	1/125 second
250    	1/250 second
500    	1/500 second
1000    	1/1000 second
2000    	1/2000 second
4000    	1/4000 second
10000    	1/10000 second
AUTO     (Switches No. 3 and 4 can be set either in upper or lower position.)	CCD iris function (Do not set this switch in this position when using an auto-iris lens.)

Caution:

- The CCD iris function is not activated for a light object to be shot, such as in outdoor condition. In such a case, use the camera with the auto-iris or manual-iris.

Notes:

- Faster shutter speeds require more light than the normal speed. (In the 1000 mode, the sensitivity is approx. 1/20 that at normal speed; in the 10000 mode, approx. 1/200.)
- When shooting with the faster shutter speed, or when a light object is being shot by setting in AUTO position (the shutter speed becomes faster), the brightness and white balance may change periodically. Shooting with artificial lighting (especially fluorescent lights) will cause the pictures to flicker. Smear (bright horizontal or vertical lines) which can often be seen with solid-state pickups may appear in the picture.

11

⑤ BLC (Back Light Compensation) switch

This function makes the iris focus on an object to be shot and is located near the center position of the screen.



Brightness area

Set this switch to "ON" at the time of back-light.

ON (upper side): Back-light compensation is activated.

The iris will be opened when the circumference is lighter than the center of the screen.

The iris will be closed when the circumference is darker than the center of the screen.

OFF (lower side): Back-light compensation is not activated.

Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric auto-iris lens or the video-level-sensing auto-iris lens.
- This function is not effective when the difference of the brightness of the center of the screen and its circumference is small.

⑥ AGC (Automatic Gain Control) switch

This automatically increases the camera's sensitivity when the level of ambient light drops.

ON (upper side): AGC is activated.

OFF (lower side): AGC is not activated.

⑦ Sync mode switch

The internal/external sync mode (automatic) or line-lock sync mode (or H/V lock mode) is available with the TK-1281EG. Set the sync mode switch correctly.

LL position:

In the line-lock setting, the camera's vertical synchronization can be driven by the 50 Hz AC signal in the power lines. To select power lines phase-locked sync, set the switch to the LL position.

Furthermore, when an external H/V sync signal is input, the camera automatically switches to the H/V lock mode.

Notes:

- Do not supply an external sync reference signal when using the camera in line-lock mode.
- In the line-lock sync mode, synchronization may not be correct for a few seconds after the power is turned on; this is not a malfunction.

I/E (Internal/external) position:

Select internal/external sync by setting the sync mode switch to the I/E position. With this setting, when the external sync reference signal is input, the camera switches to the external sync mode, and when no signal is input, the camera switches to the internal sync mode automatically.

11

5 BLC (Back Light Compensation) switch

This function makes the iris focus on an object to be shot and is located near the center position of the screen.



Brightness area

Set this switch to "ON" at the time of back-light.

ON (upper side): Back-light compensation is activated.

The iris will be opened when the circumference is lighter than the center of the screen.

The iris will be closed when the circumference is darker than the center of the screen.

OFF (lower side): Back-light compensation is not activated.

Notes:

- This function is activated when the camera SHUTTER mode select switch is set to AUTO position and when using the galvanometric auto-iris lens or the video-level-sensing auto-iris lens.
- This function is not effective when the difference of the brightness of the center of the screen and its circumference is small.

6 AGC (Automatic Gain Control) switch

This automatically increases the camera's sensitivity when the level of ambient light drops.

ON (upper side): AGC is activated.

OFF (lower side): AGC is not activated.

12

7 Sync mode switch

The internal/external sync mode (automatic) or line-lock sync mode (or H/V lock mode) is available with the TK-1180E. Set the sync mode switch correctly.

LL position:

In the line-lock setting, the camera's vertical synchronization can be driven by the 50 Hz AC signal in the power lines. To select power lines phase-locked sync, set the switch to the LL position.

Furthermore, when an external H/V sync signal is input, the camera automatically switches to the H/V lock mode.

Notes:

- Do not supply an external sync reference signal when using the camera in line-lock mode.
- In the line-lock sync mode, synchronization may not be correct for a few seconds after the power is turned on; this is not a malfunction.
- Line-lock sync operation is possible only when used with an AC power source (AC 24V, 50 Hz)

I/E (internal/external) position:

Select internal/external sync by setting the sync mode switch to the I/E position. With this setting, when the external sync reference signal is input, the camera switches to the external sync mode, and when no signal is input, the camera switches to the internal sync mode automatically.

8 V phase adjustment

If the camera is to be used in the line-lock sync mode, the vertical phase may require adjustment to synchronize the vertical phase of the camera with other camera in the system. (Vertical phase is adjustable over the range of $\pm 90^\circ$.) Make this adjustment when the vertical phase of the camera does not match with other cameras (or systems). For correct adjustment, use a multichannel oscilloscope. This vertical phase adjustment can only be made when the camera is operating in the line-lock sync mode.

Notes:

- When AC power line frequency is of 60 Hz, the line-lock sync operation is not possible.
- This adjustment is necessary only when the line-lock sync operation is performed.

9 H phase adjustment

For adjusting the horizontal phase when gen-lock (or H/V lock) operation is performed. Adjust with reference to other camera(s) in the system.

Notes:

- Gen-lock (or H/V lock) operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock (or H/V lock) operations are performed.

12

10 SC phase fine adjustment control

11 SC phase coarse adjustment switch

For adjusting the colour sub-carrier phase when gen-lock operation is performed. Adjust by changing the setting of the SC phase coarse adjustment switch (A/B) in conjunction with the SC phase fine adjustment control with reference to other camera(s) in the system.

Notes:

- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock operations are performed.

8 V phase adjustment

If the camera is to be used in the line-lock sync mode, the vertical phase may require adjustment to synchronize the vertical phase of the camera with other camera in the system. (Vertical phase is adjustable over the range of $\pm 90^\circ$.) Make this adjustment when the vertical phase of the camera does not match with other cameras (or systems). For correct adjustment, use a multichannel oscilloscope. This vertical phase adjustment can only be made when the camera is operating in the line-lock sync mode

Notes:

- When AC power line frequency is of 60 Hz, the line-lock sync operation is not possible.
- When adjusting the V phase control to observe the AC 24 V waveform, connect the positive pin of a probe to either of the power input connector.
- This adjustment is necessary only when the line-lock sync operation is performed.
- For more details, consult your local dealer.

9 H phase adjustment

For adjusting the horizontal phase when gen-lock (or H/V lock) operation is performed. Adjust with reference to other camera(s) in the system.

Notes:

- Gen-lock (or H/V lock) operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock (or H/V lock) operations are performed.
- For more details, consult your local dealer.

10 SC phase fine adjustment control

11 SC phase coarse adjustment switch

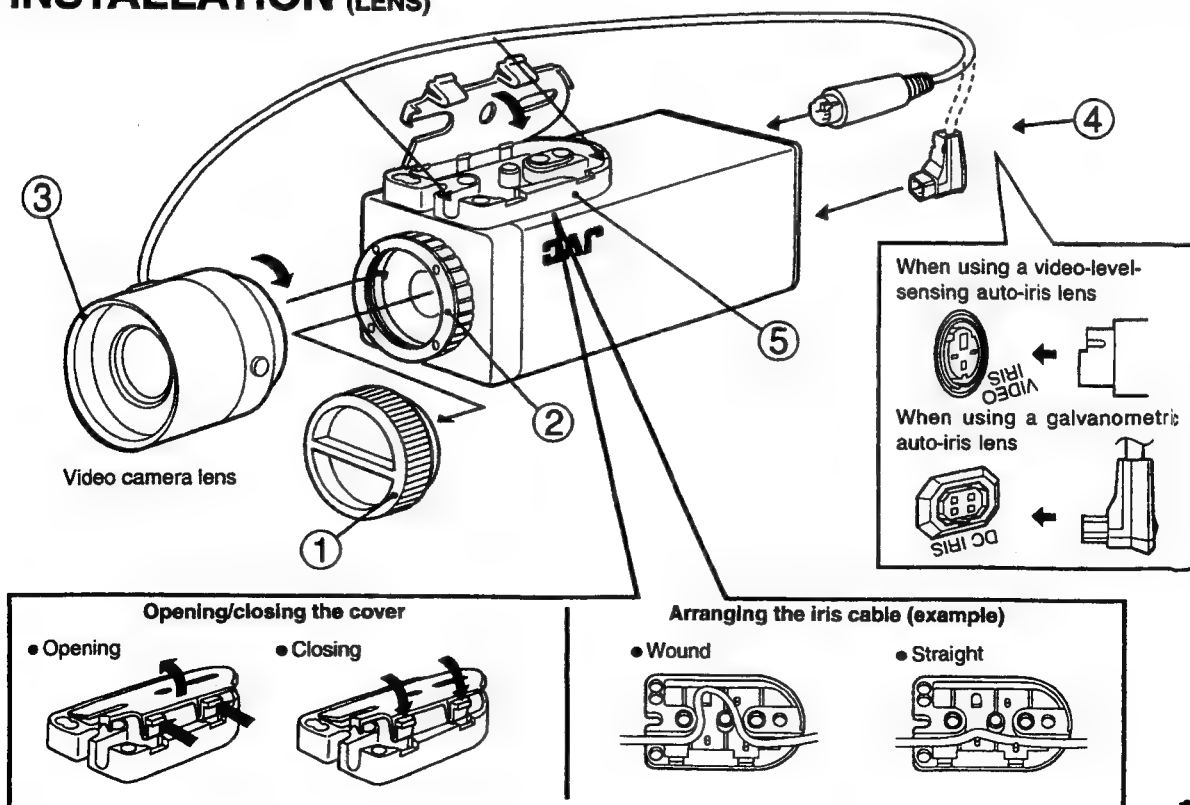
For adjusting the colour sub-carrier phase when gen-lock operation is performed. Adjust by changing the setting of the SC phase coarse adjustment switch (A/B) in conjunction with the SC phase fine adjustment control with reference to other camera(s) in the system.

Notes:

- Gen-lock operation may become unstable using a signal containing severe jitter (vertical or horizontal picture vibrations) such as a video recorder playback signal.
- This adjustment is not necessary unless gen-lock operations are performed.
- For further details, consult your local dealer.

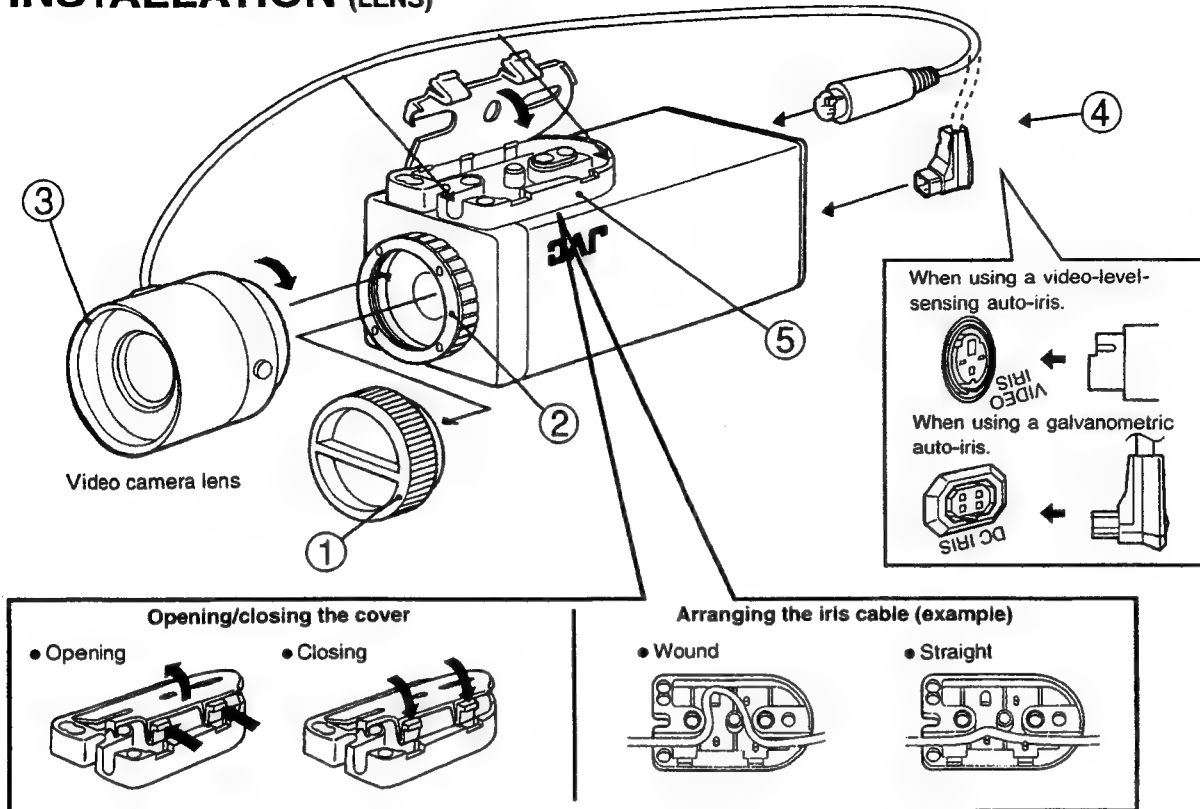
13

INSTALLATION (LENS)



13

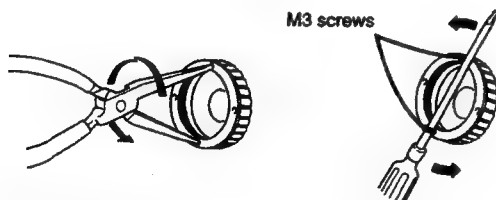
INSTALLATION (LENS)



14

Mounting a lens

- ① Unscrew the lens mount cap to remove it.
- ② Attach or remove the C-mount adapter depending on the lens to be used.
 - If the adapter is attached so tightly that is difficult to remove, use long-nosed pliers to remove it. Insert the tips of the pliers into the holes with no threads, then turn to remove. A screwdriver can also be used, as shown. Insert M3 screws into the holes so that the screwdriver has something to grip. (Use the same method when the adapter and lens are attached too tightly.)



- ③ Attach the lens to the lens mount. Secure it so that it does not become loose.
- ④ If the lens has an auto-iris mechanism, connect the iris cable to the VIDEO IRIS connector or DC IRIS connector.
 - When installing a video-level-sensing auto-iris lens, connect the lens cable to the VIDEO IRIS connector.
 - When installing a galvanometric auto-iris lens, connect the lens cable to the DC IRIS connector.

- ⑤ If the lens has an auto-iris mechanism, attach the auto-iris cable to the camera via the tripod mounting base (when the cable is too long).

Notes:

- Read the instruction manual of the lens carefully.
- If the auto-iris lens has a different type of plug, replace it with the plug provided.
- A cable with a diameter of 2 mm–4.5 mm can be secured with the tripod mounting base.
- When mounting a lens, it may require adjustment of the flange-back. Perform adjustment if necessary. See page 15.

Adjusting auto-iris lenses

Make this adjustment after connecting the camera to a power source and to a monitor.

- ① Set AGC switch to OFF.
 - ② When using a video-level-sensing auto-iris lens:

Adjust the LEVEL control of the lens to obtain optimum pictures.

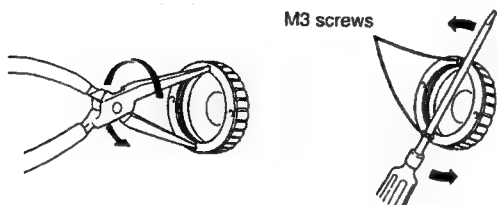
When using a galvanometric auto-iris lens:

Adjust the IRIS LEVEL control of the camera to obtain optimum pictures.
 - ③ Set AGC switch to ON
- It is recommended that the AGC be used in the ON position after adjusting the video LEVEL control.

14

Mounting a lens

- ① Unscrew the lens mount cap to remove it.
- ② Attach or remove the C-mount adapter depending on the lens to be used.
 - If the adapter is attached so tightly that is difficult to remove, use long-nosed pliers to remove it. Insert the tips of the pliers into the holes with no threads, then turn to remove. A screwdriver can also be used, as shown. Insert M3 screws into the holes so that the screwdriver has something to grip. (Use the same method when the adapter and lens are attached too tightly.)



- ③ Attach the lens to the lens mount. Secure it so that it does not become loose.
- ④ If the lens has an auto-iris mechanism, connect the iris cable to the VIDEO IRIS connector or DC IRIS connector.
 - When installing a video-level-sensing auto-iris lens, connect the lens cable to the VIDEO IRIS connector.
 - When installing a galvanometric auto-iris lens, connect the lens cable to the DC IRIS connector.

- ⑤ If the lens has an auto-iris mechanism, attach the auto-iris cable to the camera via the tripod mounting base (when the cable is too long).

Notes:

- Read the instruction manual of the lens carefully.
- If the auto-iris lens has a different type of plug, replace it with the plug provided.
- A cable with a diameter of 2 mm–4.5 mm can be secured with the tripod mounting base.
- When mounting a lens, it may require adjustment of the flange-back. Perform adjustment if necessary. See page 16.

Adjusting auto-iris lenses

Make this adjustment after connecting the camera to a power source and to a monitor.

- ① Set AGC switch to OFF.
 - ② When using a video-level-sensing auto-iris lens:

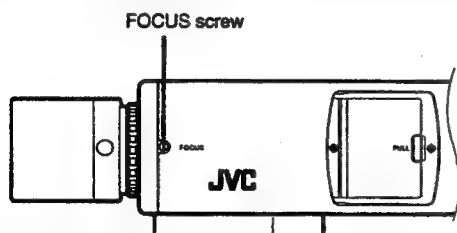
Adjust the LEVEL control of the lens to obtain optimum pictures.

When using a galvanometric auto-iris lens:
Adjust the IRIS LEVEL control of the camera to obtain optimum pictures.
 - ③ Set AGC switch to ON
- It is recommended that the AGC be used in the ON position after adjusting the video LEVEL control.

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Flange-back adjustment

When a lens is mounted, adjustment of the flange back (the distance from the lens mounting position to the focal point) may sometimes be required. Adjust when the correct focus cannot be obtained with the lens focus ring.



With a fixed-focus lens

- ① Fully open the aperture and set the focus ring to "∞" (infinity).
 - In the case of an auto-iris lens only, shoot a comparatively dark object so that the aperture is open.
- ② Turn the FOCUS screw to focus with a screwdriver.

Caution:

- Do not forcibly turn the FOCUS screw, as it will cause damage to the camera.

Note:

- When focusing, point the camera at an object that is more than 2000 times the focal length of the lens away from the front of the lens. (For example, if the focal length is 7.5 mm, the object should be more than 15 m away from the camera.)

With a zoom lens

- ① Fully open the aperture and set the lens to the maximum telephoto position. Then turn the focus ring to focus.
 - In the case of an auto-lens only, shoot a comparatively dark object so that aperture is open.
- ② Set the lens to its maximum wide-angle position.
- ③ Turn the FOCUS screw to focus with a screwdriver.
- ④ Repeat steps ① – ③ until the difference between focusing positions ① and ② becomes smallest.

Caution:

- Do not forcibly turn the FOCUS screw, as it will cause damage to the camera.

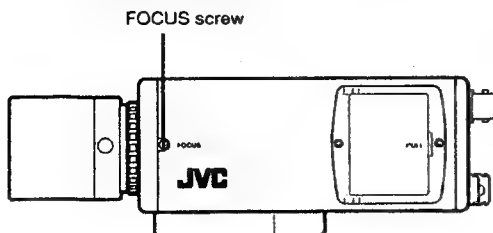
Note:

- When focusing, point the camera at an object that is more than 5 times the minimum focal distance away from the lens. (for example, if the minimum focal distance is 1m, the object should be more than 5 m away from the camera.)

15

Flange-back adjustment

When a lens is mounted, adjustment of the flange back (the distance from the lens mounting position to the focal point) may sometimes be required. Adjust when the correct focus cannot be obtained with the lens focus ring.



With a fixed-focus lens

- ① Fully open the aperture and set the focus ring to "∞" (infinity).
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- When focusing, point the camera at an object that is more than 2000 times the focal length of the lens away from the front of the lens. (For example, if the focal length is 7.5 mm, the object should be more than 15 m away from the camera.)

With a zoom lens

- ① Fully open the aperture and set the lens to the maximum telephoto position. Then turn the focus ring to focus.
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Caution:

- Do not forcibly turn the FOCUS screw, as it will cause damage to the camera.

Note:

- When focusing, point the camera at an object that is more than 5 times the minimum focal distance away from the lens. (for example, if the minimum focal distance is 1m, the object should be more than 5 m away from the camera.)

Lens that can be used

- The TK-1281EG can use 1/2", 2/3" or 1" video camera C-mount lenses when the C-mount adapter (standard accessory) is installed. When removed, 1/2" video camera CS-mount lenses can also be used.
- Use a suitable lens for the required area of view. The area of view for different focal lengths can be obtained using the following formulae. (Use as reference data, when the distance between camera and object is more than 100 times the focal length.)

In the case of using a 1/2" lens

$$\text{Height of the area of view (m)} = \frac{4.8 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

$$\text{Width of the area of view (m)} = \frac{6.4 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

Notes:

- Use video-iris lenses powered by DC 9 V–10 V with a power consumption of 50 mA or less.
- L in the illustration below should be as shown in the following table. If L exceeds the value in the table, it may damage the inside of the camera and correct mounting may be impossible; never use such lenses. Be sure not to attach the C-mount adapter when using a CS-mount lens.

Recommended focal point



Flange-back

Lens	Flange-back	Distance L
C-mount lens*	17.526 mm	Less than 9 mm
CS-mount lens**	12.5 mm	Less than 4 mm

* With the C-mount adapter attached.

** With the C-mount adapter removed.

- Lenses designed for colour video cameras are recommended. Lenses designed for B/W cameras may have inferior colour reproduction and picture quality. In particular, they are not suitable for use outdoors or in very bright conditions. When using a lens with an ND filter attached, shooting may not be possible with the minimum required illumination specified.

Lens that can be used

- The TK-1180E can use C-mount lenses when the C-mount adapter (standard accessory) is installed. when removed, CS-mount lenses can also be used.
- Use a suitable lens for the required area of view. The area of view for different focal lengths can be obtained using the following formulae. (Use as reference data, when the distance between camera and object is more than 100 times the focal length.)

In the case of using a 1/3" lens

$$\text{Height of the area of view (m)} = \frac{3.6 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

$$\text{Width of the area of view (m)} = \frac{4.8 \times \text{Distance between camera and object (m)}}{\text{Focal length of lens (mm)}}$$

Notes:

- Use video-iris lenses powered by DC 9 V-10 V with a power consumption of 50 mA or less.
- L in the illustration below should be as shown in the following table. If L exceeds the value in the table, it may damage the inside of the camera and correct mounting may be impossible; **never** use such lenses. Be sure not to attach the C-mount adapter when using a CS-mount lens.

Recommended focal point



Lens	Flange-back	Distance L
C-mount lens*	17.526 mm	Less than 9 mm
CS-mount lens**	12.5 mm	Less than 4 mm

Flange-back

- * With the C-mount adapter attached.
- ** With the C-mount adapter removed.

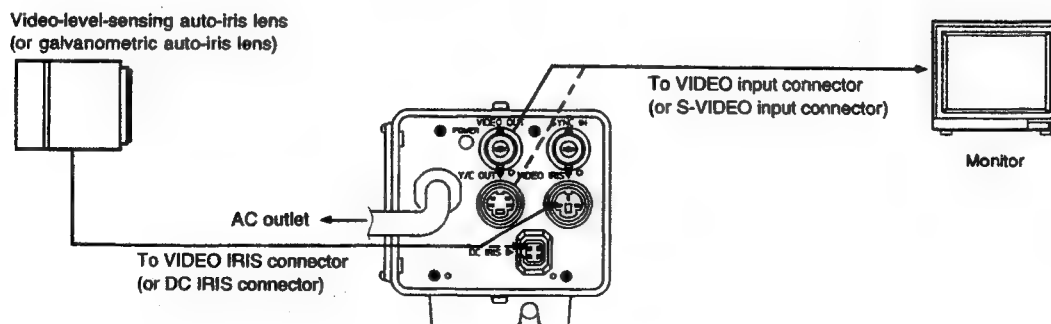
- Lenses designed for colour video cameras are recommended. Lenses designed for B/W cameras may have inferior colour reproduction and picture quality. In particular, they are not suitable for use outdoors or in very bright conditions. When using a lens with an ND filter attached, shooting may not be possible with the minimum required illumination specified.

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CONNECTION EXAMPLES

- Do not turn any component's power on until all connections are completed.
- Also read the instruction manuals of all the equipment used carefully.

Example 1: When a single camera is used

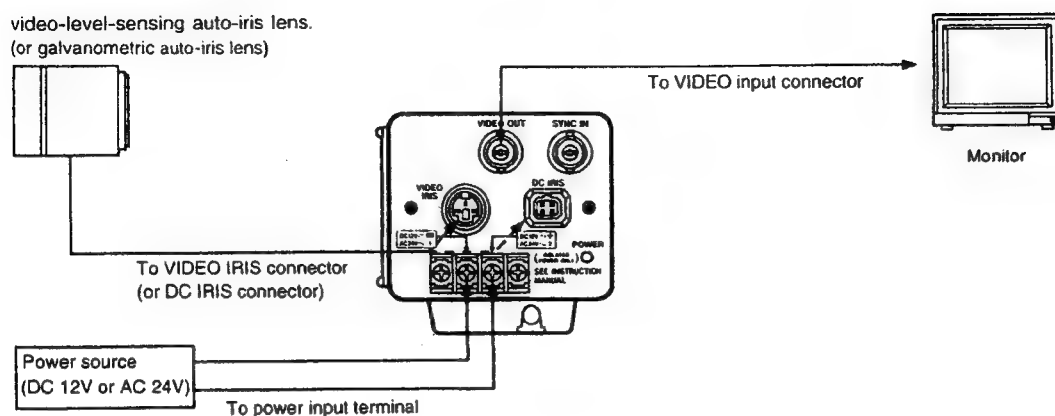


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CONNECTION EXAMPLES

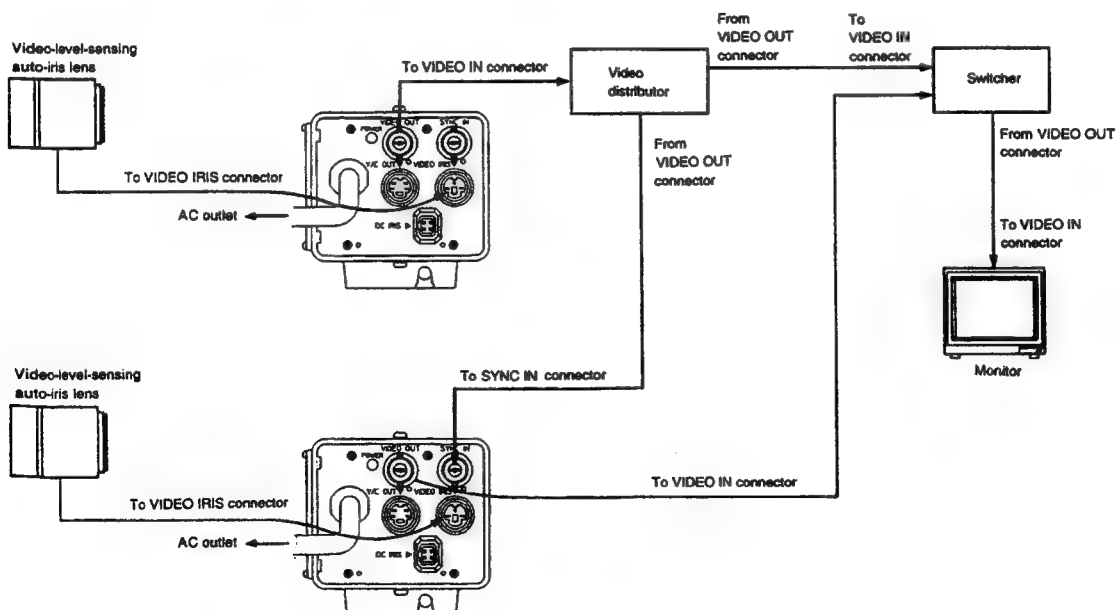
- Do not turn any component's power on until all connections are completed.
- Also read the instruction manuals of all the equipment used carefully.

Example 1: When a single camera is used



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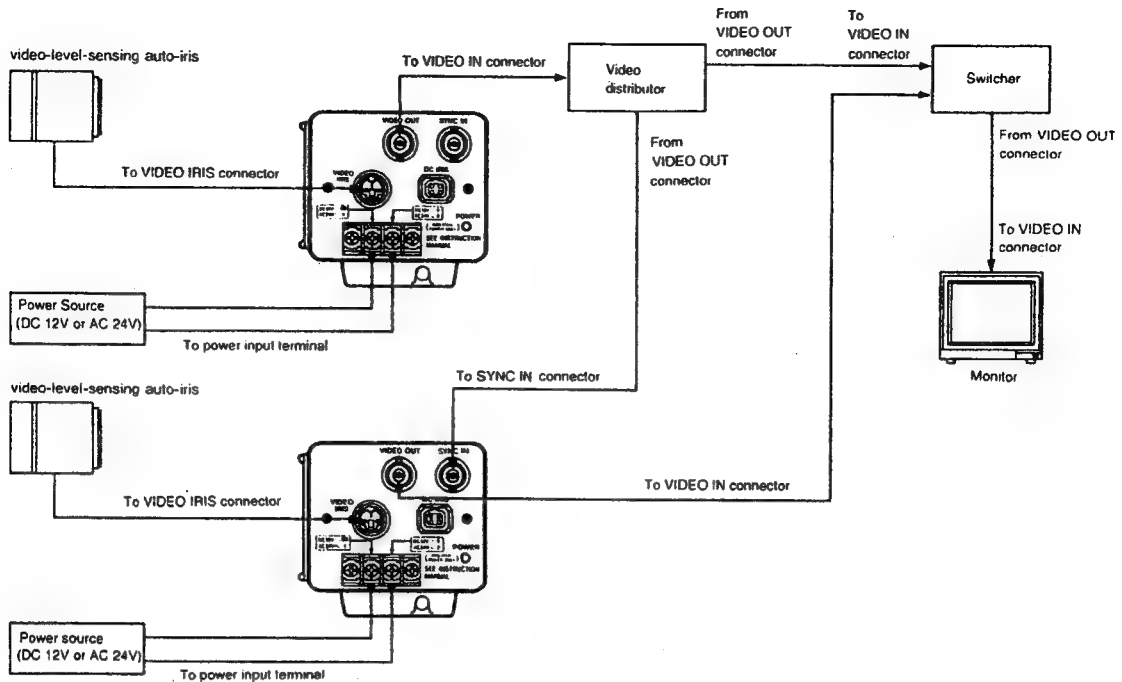
Example 2: When more than one camera is gen-locked



- For an example of connection showing line-lock operation, see page 6. Also, for the settings and adjustments required in line-lock operation, see page 11, 12.

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Example 2: When more than one camera is gen-locked



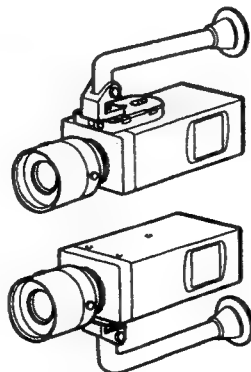
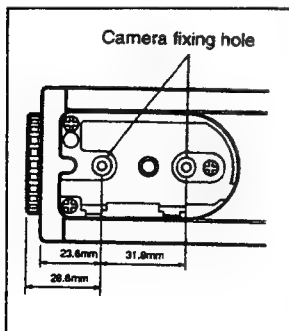
- For an example of connection showing line-lock operation, see page 6. Also, for the settings and adjustments required in line-lock operation, see page 12, 13.

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INSTALLATION (CAMERA)

Installation

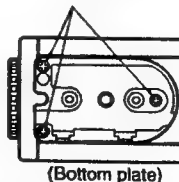
- Camera head can be installed on a tripod or a fixing part from the upper plate or the bottom plate by using the camera fixing hole (1/4", 20 UNC) on the tripod mounting base. The tripod mounting base has been installed on the bottom plate when shipped from factory. Move the tripod mounting base when installing the camera head from the upper plate.
- There are two camera fixing holes on the tripod mounting base. Use the two holes to increase the fixing intensity when installing the camera head specially.



Tripod mounting base movement

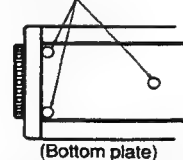
- 1 Remove the tripod mounting base fixing screw (black×3) to remove the tripod mounting base.

Tripod fixing screws



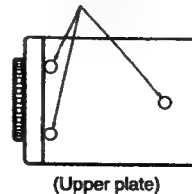
- 3 Attach the hole seals peeled off in step 2 onto the holes on the bottom plate attaching the tripod mounting base.

Hole seals



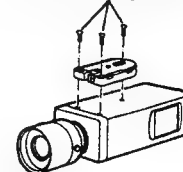
- 2 Peel off the hole seals on the upper plate. (Do not throw them away.)

Hole seals



- 4 Attach the tripod mounting base on the upper plate of the camera head with the tripod mounting base fixing screws (black×3).

Tripod fixing screws

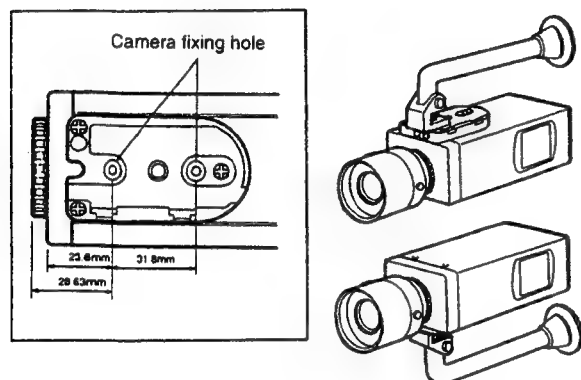


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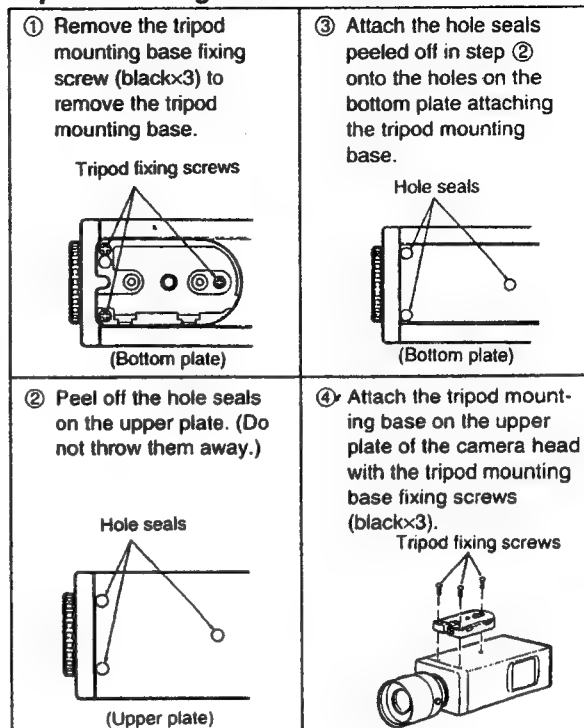
INSTALLATION (CAMERA)

Installation

- Camera head can be installed on a tripod or a fixing part from the upper plate or the bottom plate by using the camera fixing hole (1/4", 20 UNC) on the tripod mounting base. The tripod mounting base has been installed on the bottom plate when shipped from factory. Move the tripod mounting base when installing the camera head from the upper plate.
- There are two camera fixing holes on the tripod mounting base. Use the two holes to increase the fixing intensity when installing the camera head specially.



Tripod mounting base movement



PRECAUTIONS (INSTALLATION)

- **Never expose the camera to rain or water.** Water can cause malfunctions and damage the camera.
- **Do not install the camera where the temperature could exceed the allowable range.** If used at extremely low or high temperatures, the camera could be damaged (allowable operating temperature range -10°C to +50°C).
- **Avoid installing in a humid or dusty place.** This could damage the camera.
- **Avoid installing in places where there is radiation.** This could damage CCD and other components and cause a malfunction.
- **Avoid installing in places where there are strong magnetic fields and electric signals.** The picture could be distorted.
- **Avoid installing in places where the camera would be subject to strong vibrations.** This could damage components and degrade the picture.

*Also read "PRECAUTIONS (USE)" on page 3 carefully.

PRECAUTIONS (INSTALLATION)

- **Never expose the camera to rain or water.** Water can cause malfunctions and damage the camera.
- **Do not install the camera where the temperature could exceed the allowable range.** If used at extremely low or high temperatures, the camera could be damaged (allowable operating temperature range -10°C to +50°C).
- **Avoid installing in a humid or dusty place.** This could damage the camera.
- **Avoid installing in places where there is radiation.** This could damage CCD and other components and cause a malfunction.
- **Avoid installing in places where there are strong magnetic fields and electric signals.** The picture could be distorted.
- **Avoid installing in places where the camera would be subject to strong vibrations.** This could damage components and degrade the picture.

* Also read "Precautions (use)" on page 3 carefully.

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SPECIFICATIONS

Type	: Colour video camera	Recommended subject illumination	: 2000 lux
Signal system	: Based on PAL standard	Switching functions	: AGC (ON, OFF), Shutter mode (NORM, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, AUTO) White balance mode (MANU, Automatic, halogen lamp), BLC mode (ON, OFF), sync mode (LL (H/V), I/E)
Pickup element	: Interline-transfer system CCD solid-state image sensor (with complementary color filter)	Adjusting functions	: Flange-back, manual white balance (2 axes; G-Mg, R-B), V phase, H phase, SC phase, IRIS LEVEL control
Pickup colour system	: Single CCD complementary colour system	Lens mount	: C mount (with C-mount adapter)/ CS mount (without C-mount adapter)
No. of effective pixels	: 752 (H) × 582 (V)	Power requirement	: 220 - 240 V AC, 50/60 Hz
Pickup area	: 6.4(H) × 4.8 (V) mm	Power consumption	: 8.5 W
Scanning lines	: 625 lines, 2:1 interlaced	Operating temperature range	: -10°C to +50°C
Scanning frequency	: (H) 15.625 kHz (V) 50 Hz	Operating humidity	: Less than 90% Rh (noncondensing)
Sync system	: Internal, External, Line lock, H/V lock	Maximum external dimensions	: Approx. 69(W) × 68(H) × 220(D) mm (without lens mount cap)
Sync input	: Composite video signal (VBS)/ 1 Vp-p, 75 ohms terminated (or black burst signal (BB))	Weight	: Approx. 1,220 g
Video output	: Composite video signal: 1 Vp-p, 75 ohms, unbalanced Separated Y/C video signals: Y/1 Vp-p, 75 ohms, unbalanced C/0.3 Vp-p (burst), 75 ohms, unbalanced	Cable length	: Approx. 2.4 m
Video S/N ratio	: 50 dB (2000 lux, AGC switch set to "OFF", at weighting)		
Resolution	: 460 TV lines (horizontal)		
Minimum required illumination	: 1.5 lux (f/1.2, AGC switch set to "ON")		

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SPECIFICATIONS

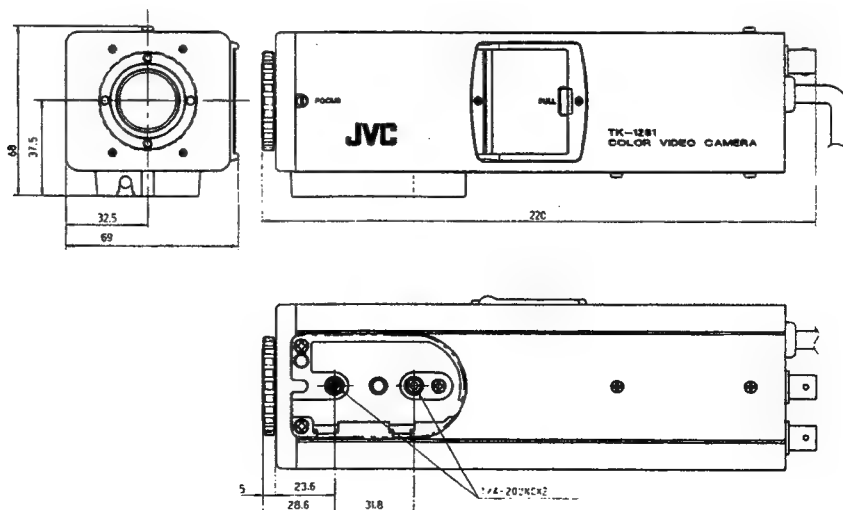
Type	: Colour video camera head	Recommended subject illumination	: 2000 lux
Signal system	: Based on PAL standard	Switching functions	: AGC (ON, OFF), Shutter mode (NORM, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, AUTO), White balance mode (MANU, Automatic, halogen lamp), BLC mode (ON, OFF), sync mode (LL (H/V), I/E)
Pickup element	: Interline-transfer system CCD solid-state image sensor (with complementary colour filter)	Adjusting functions	: Flange-back, manual white balance (2 axes; G-Mg, R-B), V phase, H phase, SC phase, IRIS LEVEL control
Pickup colour system	: Single CCD complementary colour system	Lens mount	: C mount (with C-mount adapter)/ CS mount (without C-mount adapter)
No. of effective pixels	: 500 (H) × 582 (V)	Power requirement	: DC 12V or AC 24V, 50 Hz
Pickup area	: 4.8(H) × 3.6 (V) mm	Power consumption (max.)	: 0.6A (DC 12V) 6.5 W (AC 24V)
Scanning lines	: 625 lines, 2:1 interlaced	Operating temperature range	: -10°C to +50°C
Scanning frequency	: (H) 15.625 kHz (V) 50 Hz	Operating humidity	: Less than 90% Rh (noncondensing)
Sync system	: Internal, External, Line lock, H/V lock	Maximum external dimensions	: Approx. 69(W) × 65(H) × 150(D)mm (without lens mount cap)
Sync input	: Composite video signal (VBS)/ 1 Vp-p, 75 ohms terminated (or black burst signal (BB))	Weight:	: Approx. 500 g
Video output	: Composite video signal: 1 Vp-p, 75 ohms, unbalanced		
Video S/N ratio	: 46 dB (1000 lx, AGC switch set to "OFF", at weighting)		
Resolution	: 330 TV lines (horizontal)		
Minimum required illumination	: 2 lx (1/1.2, AGC switch set to "ON")		

22

Provided accessory : Iris plug (3-pin) × 1
Iris plug (4-pin) × 1
Y/C plug (4 pin) × 1

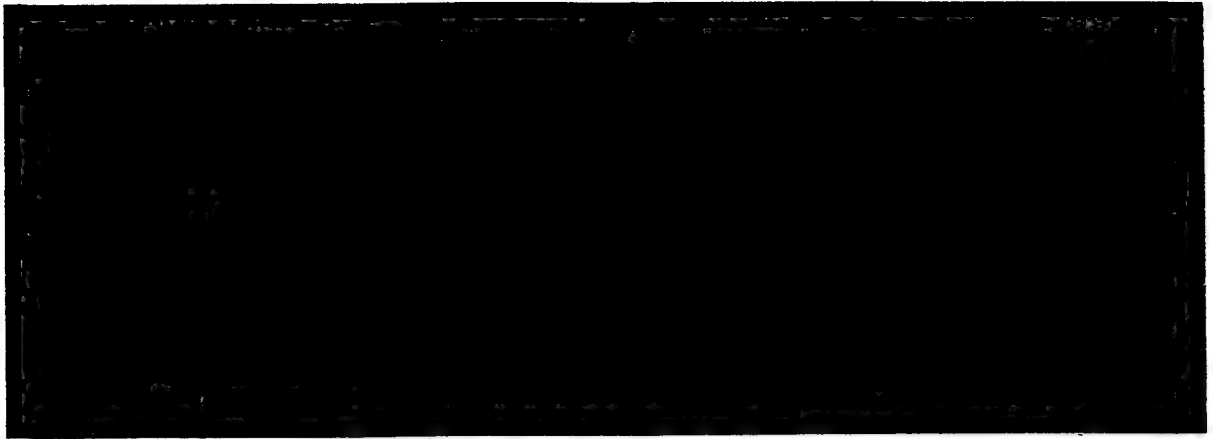
- Design and specifications subject to change without notice.
- This colour video camera is designed to output video signals conforming to the PAL standard, so that it cannot be used with video recorders or colour monitors which use colour systems other than PAL.

Dimensions (unit: mm)



Provided accessory Iris plug (3-pin) × 1
 Iris plug (4-pin) × 1

- Design and specifications subject to change without notice.
- This colour video camera is designed to output video signals conforming to the PAL standard, so that it cannot be used with video recorders or colour monitors which use colour systems other than PAL.



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VICTOR COMPANY OF JAPAN, LIMITED

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MAIN PARTS LOCATION

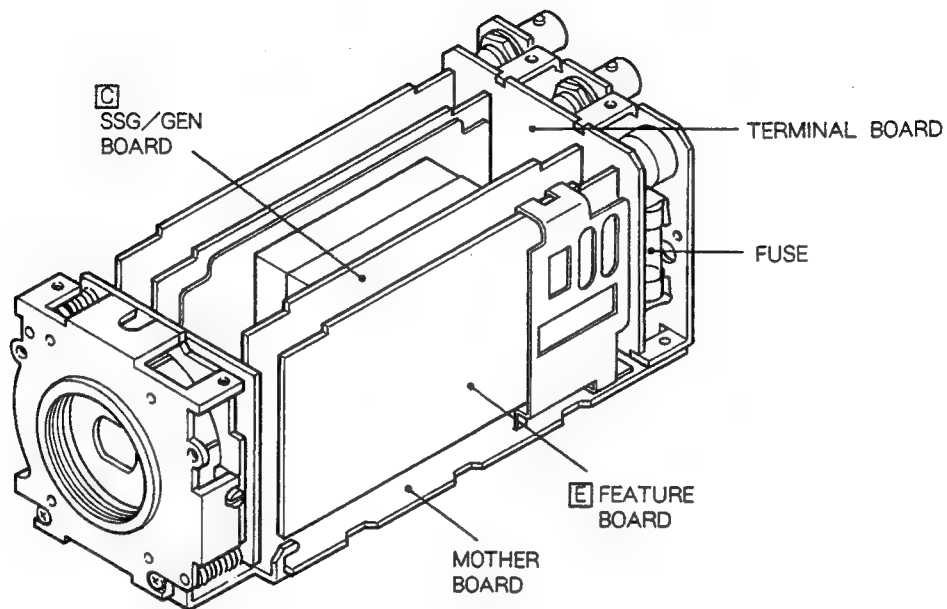


Fig. A

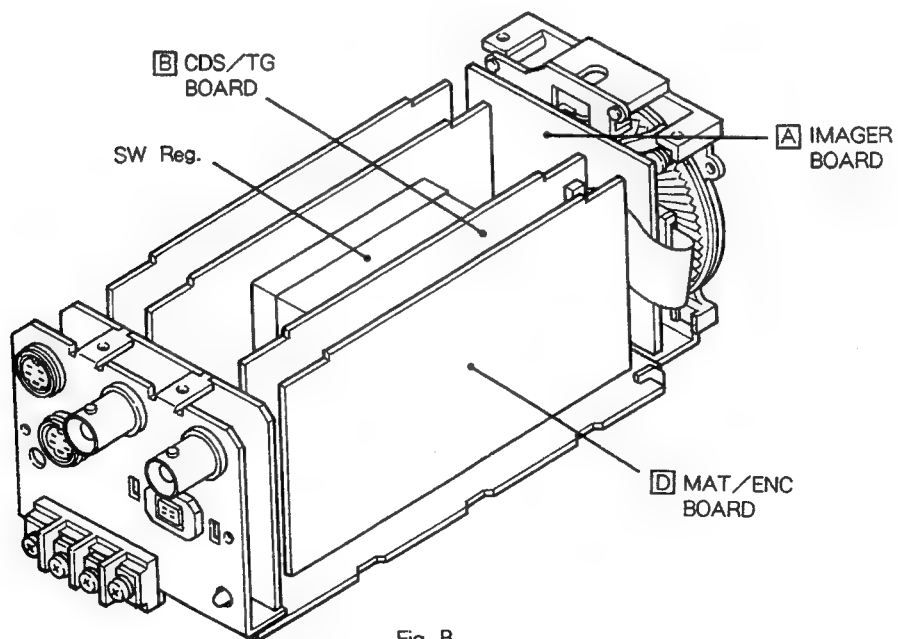


Fig. B

SPECIFIC SERVICE INSTRUCTIONS

■ TWO-SIDE HOLE-THROUGH PC BOARD

A two-sided hole-through PC Board is used on this camera. Patterns and wires are designed extra thin to attain highdensity component mounting. Rough handling may damage the patterns/wires or other components. When disassembling, repairing or adjusting the PC boards, exercise care to avoid damage.

■ REPAIRING CIRCUIT BOARD MODULES

(1) Removing circuit board module

Pull out the circuit board, after removing solder completely with a solder sucker.

NOTE:

- Take care not to damage or remove solder from other parts.
- If more than two circuit boards are removed, make sure that they are replaced in the proper position.
- Some circuit boards cannot be removed unless the shielding case and chassis frame have been removed. When removing any circuit board, check if this applies to the PC board.

(2) Checking circuit board module

To check each circuit board, take out the module and extend with wires, etc.

■ REPLACING CHIP COMPONENTS

Use a soldering iron (temperature 260~300°C. about 17W) with a slim tip and high insulating ability. those with a solder sucker (about 55W) are usually easier to use.

NOTE:

This video camera uses many mini-flat ICs. To remove these, melt the solder while picking up the individual pin with fine tipped tweezers or cut off the IC pins. Take care not to scratch or peel off the BOARD foil pattern.

■ CHIP COMPONENTS DISPLAY

Besides the resistors, short jumpers, FET's, ceramic capacitors, transistors, and other chip components, the chip tantalum capacitors and chip variable resistor (CH VR) are used on the camera. None of these chip components are reusable again once they have been used.

NOTE:

1. Avoid rough handling of the VR.
 2. Use a thin-tip insulated-type. screwdriver to adjust the CH VR.
- How to read printings

On certain chip components, printing is applied as follows:

① Chip metal glaze resistor (CH MG R)

The diagram shown in Fig. A ① is applied to some of these resistors.

Reading method (Example)

$$\begin{array}{c} 1 \quad 2 \quad 3 \\ \text{---} \quad \text{---} \quad \text{---} \\ \text{---} \quad \text{---} \quad \text{---} \end{array} = 12 \times 10^3 \text{ Unit: } [\Omega]$$

② Shorting jumper (0[Ω] of CH MG R)

No diagram is applied to shorting jumpers. A "0" is printed on Type ① shown in Fig. A

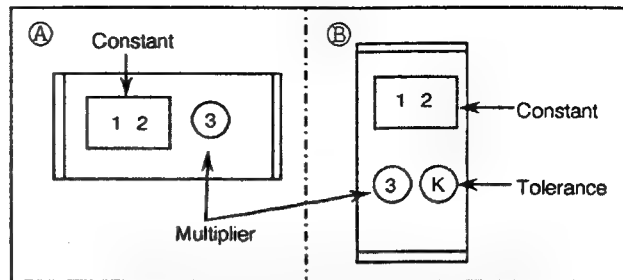


Fig.A Example of CH MG R / CH C Cap.codes

③ Chip ceramic capacitor (CH C Cap.)

- The diagram shown in Fig. A ② is applied to some of the CH C Caps. On some others, there is no diagram that is of any use to users.

Reading method (Example)

$$\begin{array}{c} 1 \quad 2 \quad 3 \quad K \\ \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \\ \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \end{array} = 12 \times 10^3 \text{ Unit: } [\mu\text{F}], \text{ Tolerance: } K(\pm 10\%)$$

- As shown in Fig. B some chip ceramic capacitors are represented by two digits. Table A shows how those figures should be read.

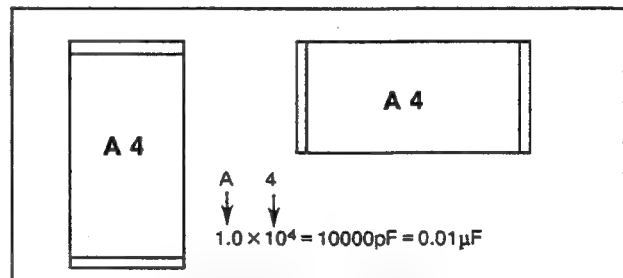


Fig.B Example of CH C Cap.codes

Alphabet	A	B	C	D	E	F	G	H	J	K
Constant	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4
Alphabet	L	M	N	P	Q	R	S	T	U	V
Constant	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2
Alphabet	W	X	Y	Z		a	b	d	e	f
Constant	6.8	7.5	8.2	9.1		2.5	3.5	4.0	4.5	5.0
Alphabet	m	n	t	y						
Constnt	6.0	7.0	8.0	9.0						
Numeral	0	1	2	3	4	5	6	7	8	9
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵			10 ⁻²	10 ⁻¹

Table A CH C Cap. capacity value

④ Chip Variable Resistor (CH VR)

A two-digit code is printed on some CH VRs.
They indicate a reading method, as shown in Table B.
Three-digit codes are also used. These codes are read in the same way as those for CH MG R.

⑤ Chip Tantalum Capacitor (CH Tan. Cap.)

The diagram shown in Fig.C is applied to some of the CH Tan. Caps.

Reading methd (Example)

The type shown in Fig.C is 10 μ F, 16WV chip tantalum capacitor.

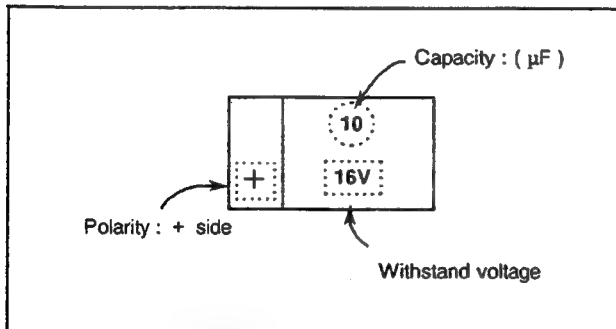


Fig.C Example of CH Tan. C Cap. codes

⑥ Chip Transistor

The labels shown in Table C are applied to the chip transistor

Parts No.	Display method
2SC2778(B,C,D)	<div>Ⓚ Ⓛ</div> <div>K.C K.D</div> <div>denotes</div> <div>2SC2778 parts ranking : B</div>
2SC2404(D)	<div>U.D</div>
32SD601(Q,R)	<div>Y.Q Y.R</div>
2SD601A(Q,R)	<div>Z.Q Z.R</div>
2SD1030(R)	<div>1ZR</div>
2SB709(P,R)	<div>A.P A.Q A.R</div>
32SB792(Q,T)	<div>I.Q I.R I.S I.T</div>
2SB970(Q,S)	<div>1RQ 1RR 1RS</div>
2SA1022(C)	<div>E.C</div>

Table C Chip transistor labels

⑦ Chip FET

The following printing is applied to the Chip FET.

Parts No.	Display method
2SK198(Q,R)	<div>Ⓚ Ⓛ</div> <div>10R</div> <div>denotes</div> <div>2SK198 parts ranking : Q</div>
2SK316	<div>1KP 1KQ</div>

Table D Chip FET codes

⑧ Chip Diode

The following labels are applied to the Chip Diode.

Parts No.	Display method
MA151WA	<div>Ⓜ N</div> <div>denotes</div> <div>MA151</div>
MA151K	<div>M.H</div>
MA151WK	<div>M.T</div>
MA151A	<div>M.A</div>
MA157	<div>M.R</div>
MA3051	<div>5.1</div>
MA3120 (L-H)	<div>12H 12L 12M</div>

Table E The display of chip diode

Code	12	22	32	52	72	13	23	33	54	73	14
Resistance Value	100 Ω	220 Ω	330 Ω	470 Ω	680 Ω	1k Ω	2.2k Ω	3.3k Ω	4.7k Ω	6.8k Ω	10k Ω
Code	24	34	54	74	15	25	35	55	75	16	
Resistance Value	22k Ω	33k Ω	47k Ω	68k Ω	100k Ω	220k Ω	330k Ω	470k Ω	680k Ω	1M Ω	

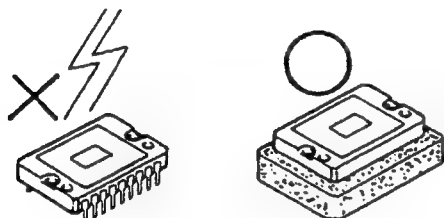
Table B CH VR resistance value display method in two-digit

■ "CHARGE COUPLED DEVICE (CCD) "IMAGER

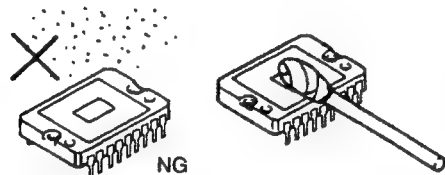
1 Precautions for handling and replacing CCD imager

CCD is characteristic of many advantages, but it also has some disadvantages. The following are measures to deal with these disadvantages.

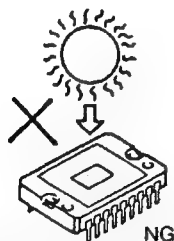
- (1) CCD imager is a circuit element which is very sensitive to static electricity.
- The potential differences caused by the electrostatic charge-which have been accumulated in the clothing and human body-sometimes destruct the insulation of the CCD imager. Therefore, handle the "high-priced" CCD imager with more attention thereto than to the C-MOS (Complementary MOS), especially during the dry season and in dry places.



- Maintain the CCD imager in the provided pack or aluminum foil so that it can be kept at the same potential. Never unpack its container until the very moment of servicing.
- (2) The CCD imager is easily damaged by dust. Also it suffers considerable deterioration, when exposed to strong light.
- When servicing, make sure that the CCD imager is kept free from such foreign material as dust. Use dry soft cloth or soft cloth moistured with ethyl alcohol to wipe off the foreign material.



- Do not exposed the CCD imager to such strong light as direct sunlight.



- (3) CCD imager is damaged instantly by the following malfunctions. Pay close attention to these malfunctions before servicing

- ① After removal of CCD, charge may remain at each terminal in the circuit side for some time. In this situation , when CCD is inserted to the socket, CCD may be distracted instantaneously due to the charge. To avoid this, CCD should be inserted with passage of some time (2 to 3 minutes) after removal.

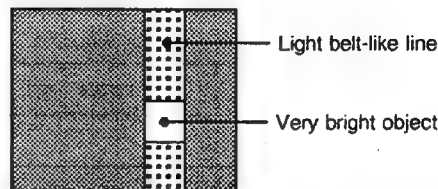
■ SPECIAL CHARACTERISTICS OF A CCD

The following phenomena can be expected when using the video camera with the CCD imager; they are not malfunctions.

• Smear phenomenon

This phenomenon occurs when shooting a very bright object (such as electronic light, fluorescent lamp, the sun or a strong reflection).

Video monitor screen.



Due to the interline-transfer organization of the CCD image sensors (Refer to "The Interline-transfer Organization of the CCD Image Sensors"), this phenomenon is caused by electronic charges generated beneath the photosensors by a light with a long wavelength, such as an infrared light.

In the shutter mode, as the signal level drops down to 1/20, the smear level becomes high relatively. However this means no failure.

• False signal

When vertical stripes or straight lines are shot, they may look wavy.

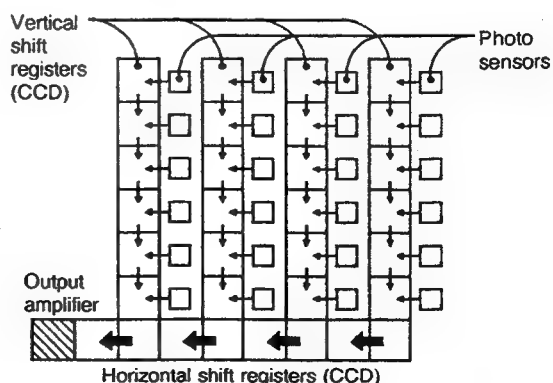
• Blemishes

The photosensor elements generate electronic charges which ultimately produce horizontal and vertical rows in the CCD image sensor.

Therefore, any malfunctioning photosensor element will eventually cause a blemish on the monitor screen.

The interline-transfer organization of CCD image sensors

This CCD video camera module adopts an interline transfer organization in which precisely aligned photosensors and vertical shift registers are arrayed interlinearly and horizontal shift register links up with the vertical shift register, as shown. Light variations are sensed by the photosensors, which generate electronic charges proportional to the light intensity. The generated charges are fed into the vertical shift registers all at one. The charges are then transferred from the vertical shift registers to the horizontal shift registers successively and finally reach the output amplifier to be read out successively.



■ DISASSEMBLY PROCEDURE

- Be sure to turn OFF power before disassembly of parts.

1. Removal of Casing Parts

1-1 Removing the rear cover

- (1) Remove the two screws (A) shown in Figure 1.

1-2 Removing the tripod base

- (1) Remove the three screws (B) in Figure 1.

1-3 Removing the aluminum case

- (1) Remove the screw (C) in Figure 1.
- (2) Pull out the case in following the arrow.

1-4 Removing the front die casting

- (1) Remove the C mount adapter.
- (2) Remove the four screws (D) in Figure 1.

1-5 Removing the side cover

- (1) Remove the two screws (E) in Figure 1.
- You may remove the aluminum case without removing the side cover.

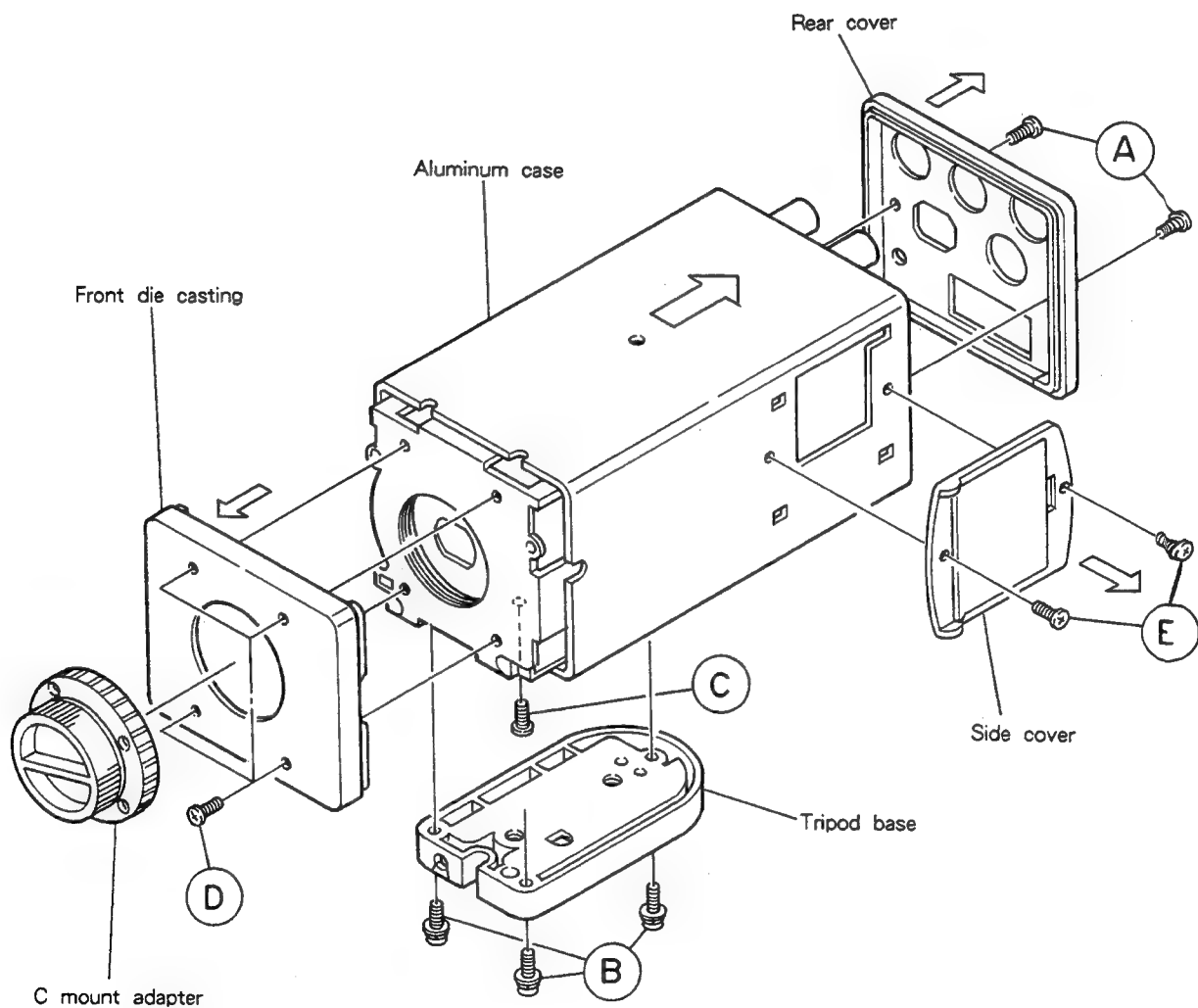


Figure 1 removing the casing parts

2. Removal of Chassis Parts

* First remove the casing parts.

2-1. Removing the top frame

- (1) Remove the four screws (F) in Figure 2.
- (2) Then the two PB holders will be removed at the same time.

2-2. Removing the chassis mount

- (1) Remove the flexible wire in Figure 3. (Pull the stopper in the direction of the arrows.)
- (2) Remove the two screws (G) in Figure 2.

2-3. Removing the rear terminal assembly

- (1) Remove the two screws (H) in Figure 2.

2-4. Removing the bottom frame

- (1) Remove the two screws (I) in Figure 2.
- (2) Move the frame in the direction of the arrow and remove it.
- (3) The side shield will then be removed at the same time.

2-5. Removing the module boards

- (1) Remove the top frame and the side shield.
- (2) Pull out each module upward and remove it.

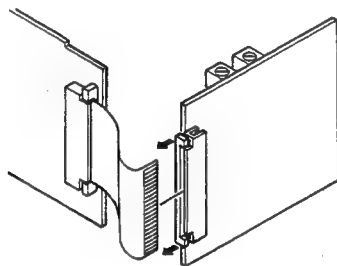


Figure 3 Removing the flexible wire

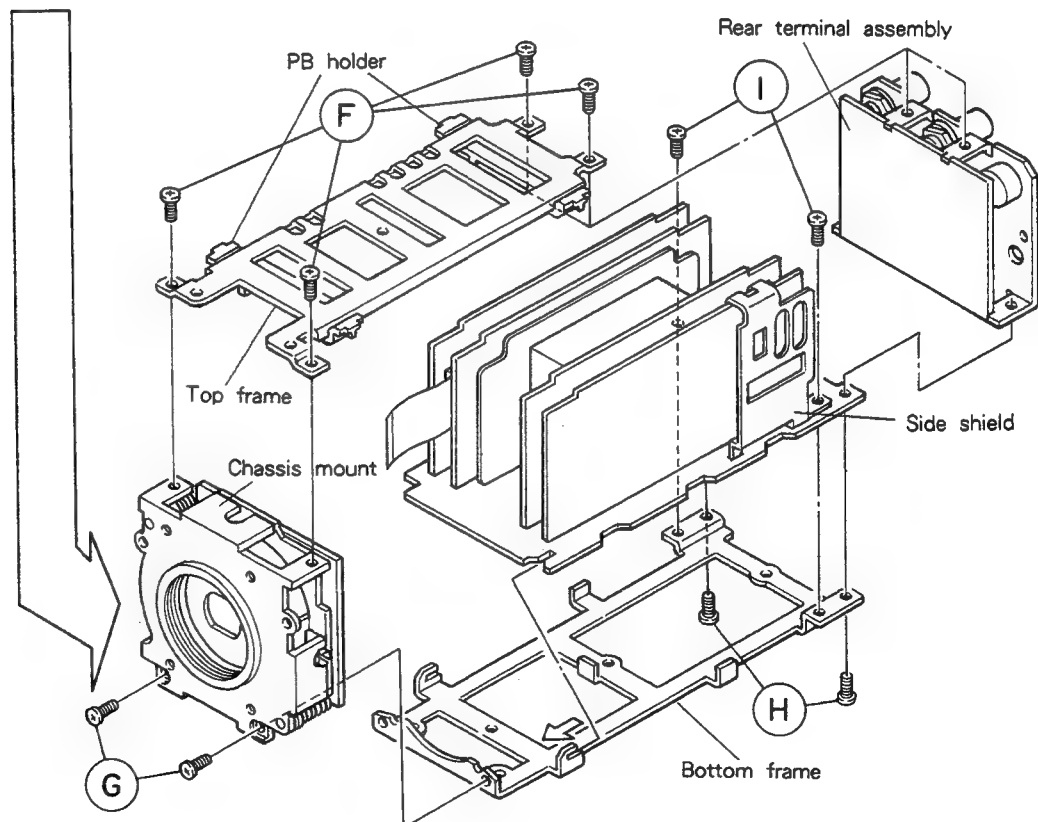


Figure 2 Removing the chassis parts

3. Replacement of the CCD Imager

- (1) Follow Paragraph 2-2 or the removal of the chassis mount to remove the chassis mount.
- (2) Remove the two screws (J) shown in Figure 4.
- (3) Pull out the imager module board in following the arrow and remove it from the chassis mount.
- (4) Remove the two screws (K) in Figure 4 and remove the LPF holder and the low-pass filter.
- (5) Remove the two screws (L) in Figure 4 and remove the CCD holder, CCD mask, and CCD imager.
- (6) After replacement, install a CCD imager with the hole on the back of it facing upward. (See Figure 5.)

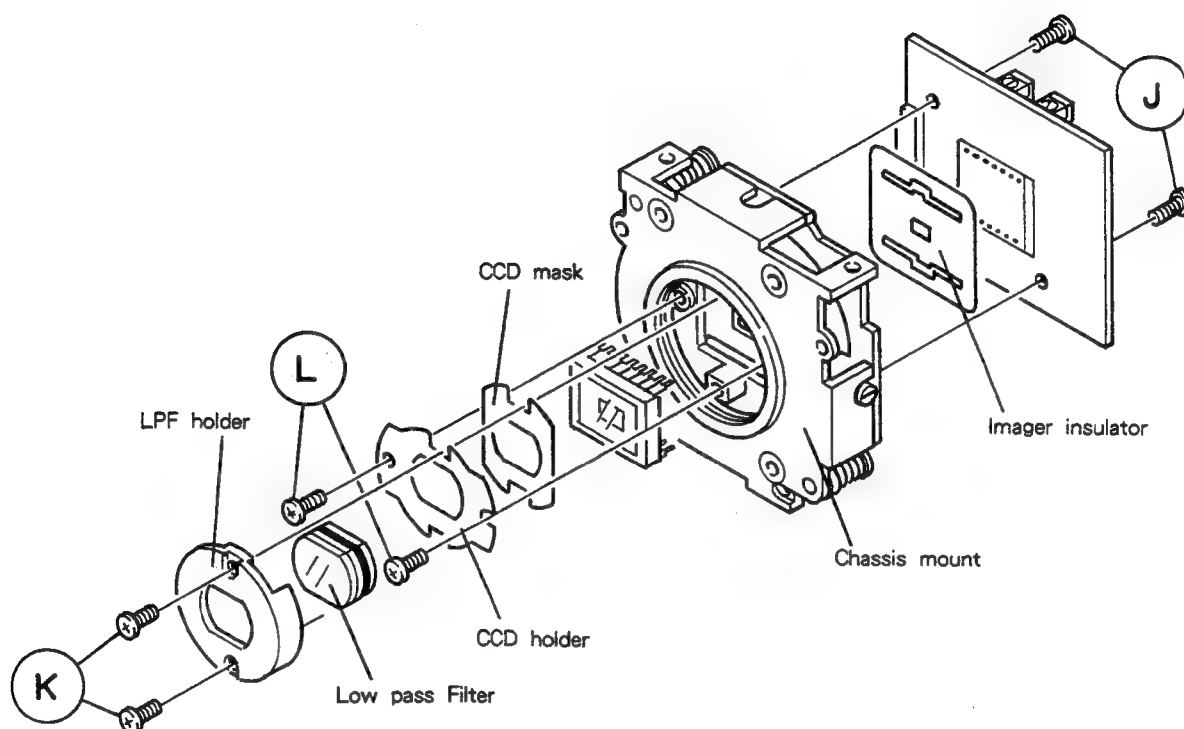


Figure 4 Replacing the CCD imager

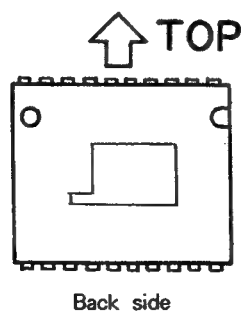


Figure 5 CCD direction

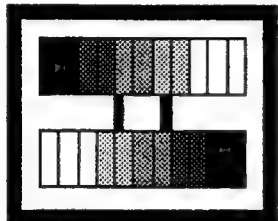

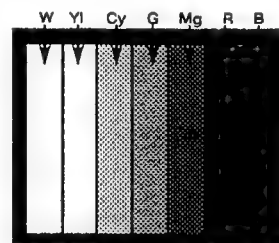
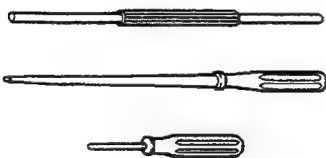

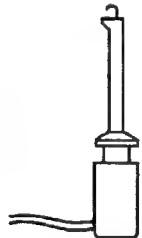
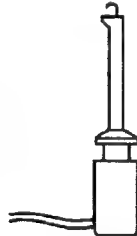
SERVICE ADJUSTMENT

TOOLS AND FIXTURES ADJUSTMENT

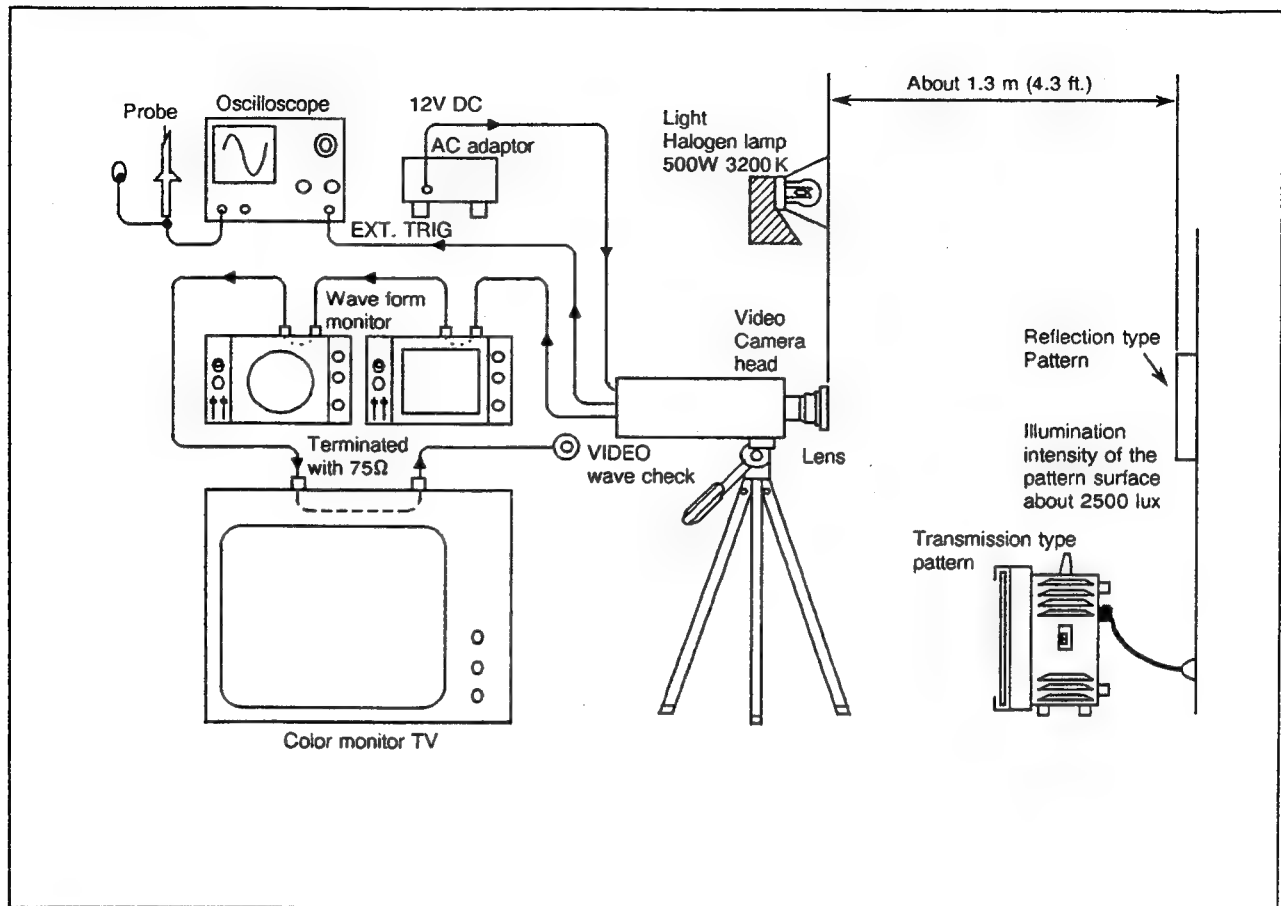
■ MEASURING INSTRUMENTS

- | | | | |
|--------------------------------------|--------|--------------------------------------|---|
| 1. Oscilloscope | 1 | 6. Power supply | 1 |
| 2. Color monitor TV (PAL-type) | 1 | Voltage: 12 V DC (for 1280E/1180E) | |
| Color temperature : 9,300K | | 7. Vectorscope (PAL-type) | 1 |
| 3. Lights | 1 or 2 | Used only if necessary. | |
| Color temperature : 3,200K | | 8. Waveform monitor (PAL-type) | 1 |
| 4. Frequency counter | 1 | Used only necessary. | |
| 5. DIGITAL DC voltmeter(DVM). | 1 | | |

■ TOOLS AND FIXTURES

1.Patterns				(Gray scale Pattern)	(White Pattern)	(Color bar Pattern)											
<p>Note: Reflection-type patterns eventually suffer from drops in signal output level or loss of output uniformity.Periodic replacement is recommended.</p>				 <p>GS-2A* Reflective type($\gamma = 2.2$)</p>	 <p>WC-2A* Reflective type</p>	 <p>CC-2T* Transmissive type</p>											
2.DRIVERS		3.COLOR TEMP.CONVERSION FILTER		4.PIN CLIP													
 <p>Adj. driver</p>		 <p>CC-12G Kenko filter, C10,C8, W4,W2,C12 KODAK Wratten gelatin filter, CC-12G</p>		 <p>Slightly bending the pin tip facilitates its use.</p>													
5.LENS		6.MODULE EXTENSION JIG			Note:												
<p>C-mount lens or CS-mount lens.Iris can be controlled manually.</p> <ul style="list-style-type: none">• Lens flange-back should be standard• Zoom lens is recommended• F1.4 lens is recommended.		 <table><tr><td>PIN</td><td>JIG No.</td><td>QTY</td></tr><tr><td>24pin</td><td>SC45283-00A*</td><td>2</td></tr><tr><td>22pin</td><td>SC45283-00B*</td><td>1</td></tr><tr><td>18pin</td><td>SC45283-00C*</td><td>2</td></tr></table> <p>If necessary, please extend PWB and use it to check voltage.</p>			PIN	JIG No.	QTY	24pin	SC45283-00A*	2	22pin	SC45283-00B*	1	18pin	SC45283-00C*	2	<p>Order parts marked with an asterisk(*) in the same way as other general parts. Parts that is not marked with asterisk(*) are able to get at your side.</p>
PIN	JIG No.	QTY															
24pin	SC45283-00A*	2															
22pin	SC45283-00B*	1															
18pin	SC45283-00C*	2															

PRIOR TO STARTING ADJUSTMENT



(1) Warming up

Before adjustment, turn on the camera to warm it up for more than 10 minutes so that the camera operation may be stabilized.

(2) Lighting

- Adjust the distance between the light and pattern so that the illumination on the pattern is about 2,500 lux and the illumination over the entire pattern surface is as uniform as possible.
- Correct adjustment will be impossible if the illumination is too high, too low or uneven.

(3) About CCD Imager

The CCD image is susceptible to static electricity. The insulator of this element might be damaged if a potential difference is caused by the electrostatic charge carried by clothes or body. Be careful when holding it because it is costly. Use special care in a dry atmosphere in a dry season.

1. Presetting

Before adjustment, preset the following switches :

- 1) INT/EXT-L/L switch → "I/E"
- 2) AGC switch → "OFF"
- 3) White Balance switch → "※" (in-door)
- 4) SHUTTER → "NORM" (OFF)
- 5) BLC → "OFF"

2. In holding a test pin with a probe, take care set contact with any other pin. The CCD imager will be damaged if some test pins are accidentally connected.

3. EXT. TRIGGER

In adjusting the signal system, extract the trigger signal as required.

H-rate : TP-11 (ID) [MAT/ENC Board]

V-rate : IC302 Pin ⑦ [FEATURE Board]

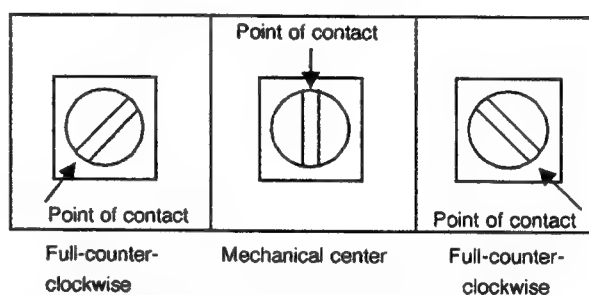
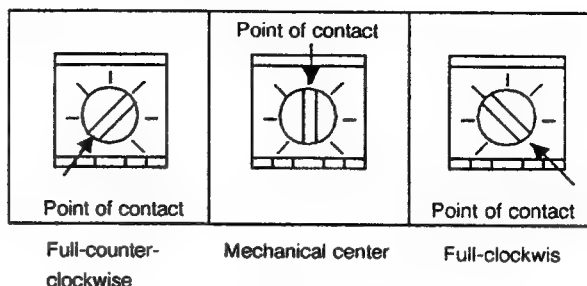
4. JUST SCAN

Unless otherwise specified, apply "just scan" to all pattern adjustments.

5. Repeat adjustments optimum conditions are established.

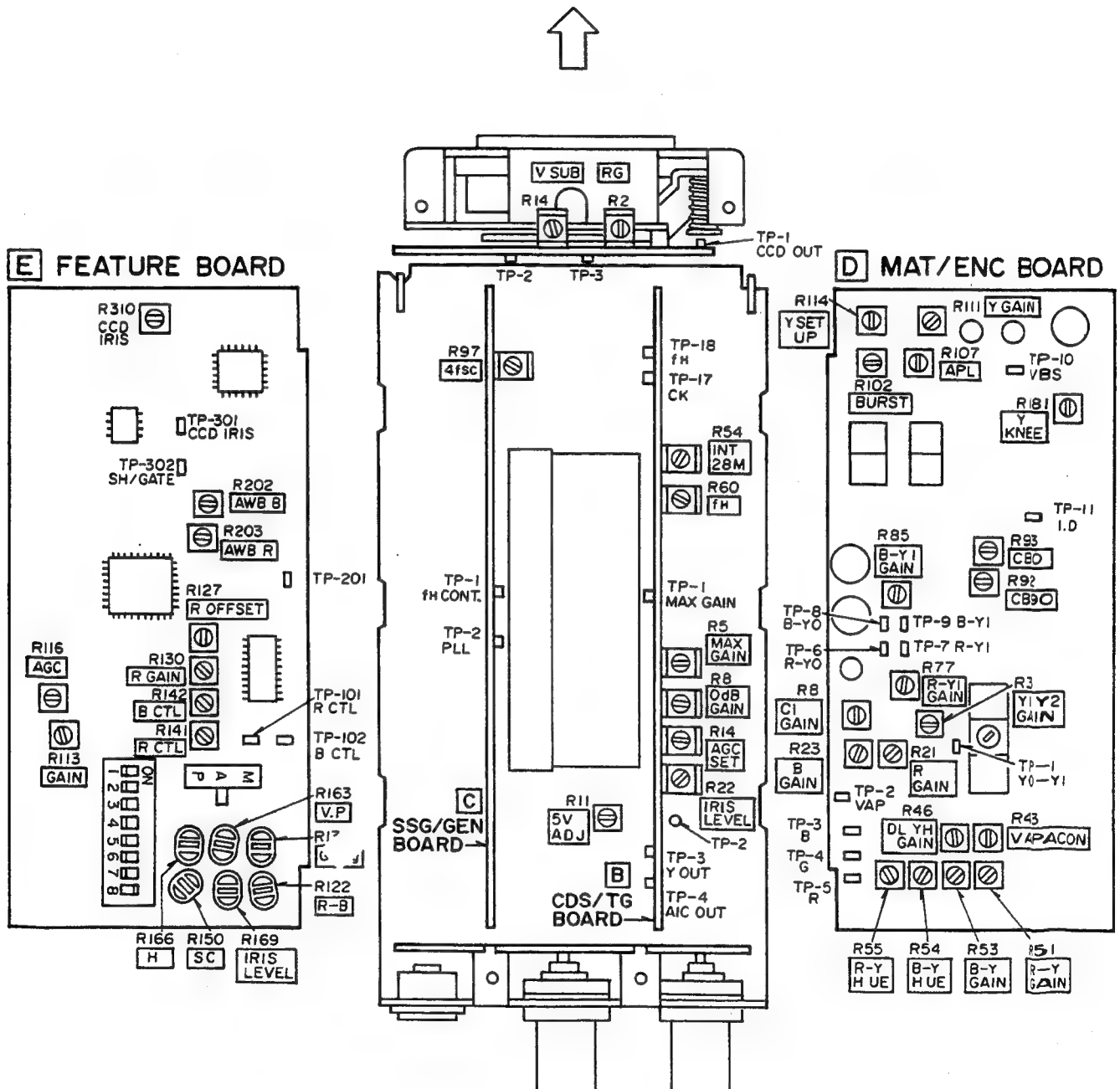
6. Chip VR

Chip VR rotating position is designated as shown in the figure below for the convenience of explanation, since the chip VR can be rotated 360°.

**7. No Adjustment of unspecified VRs**

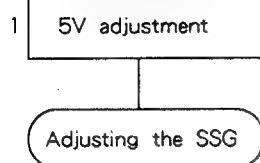
Never rotate VR's other than those specified by this instruction Manual.

ADJUSTMENT LOCATIONS

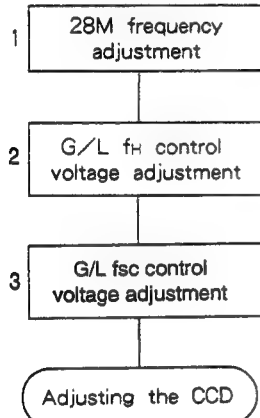


ADJUSTING STEPS

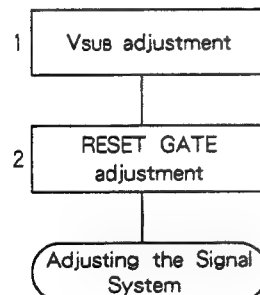
1. Adjusting the Voltage



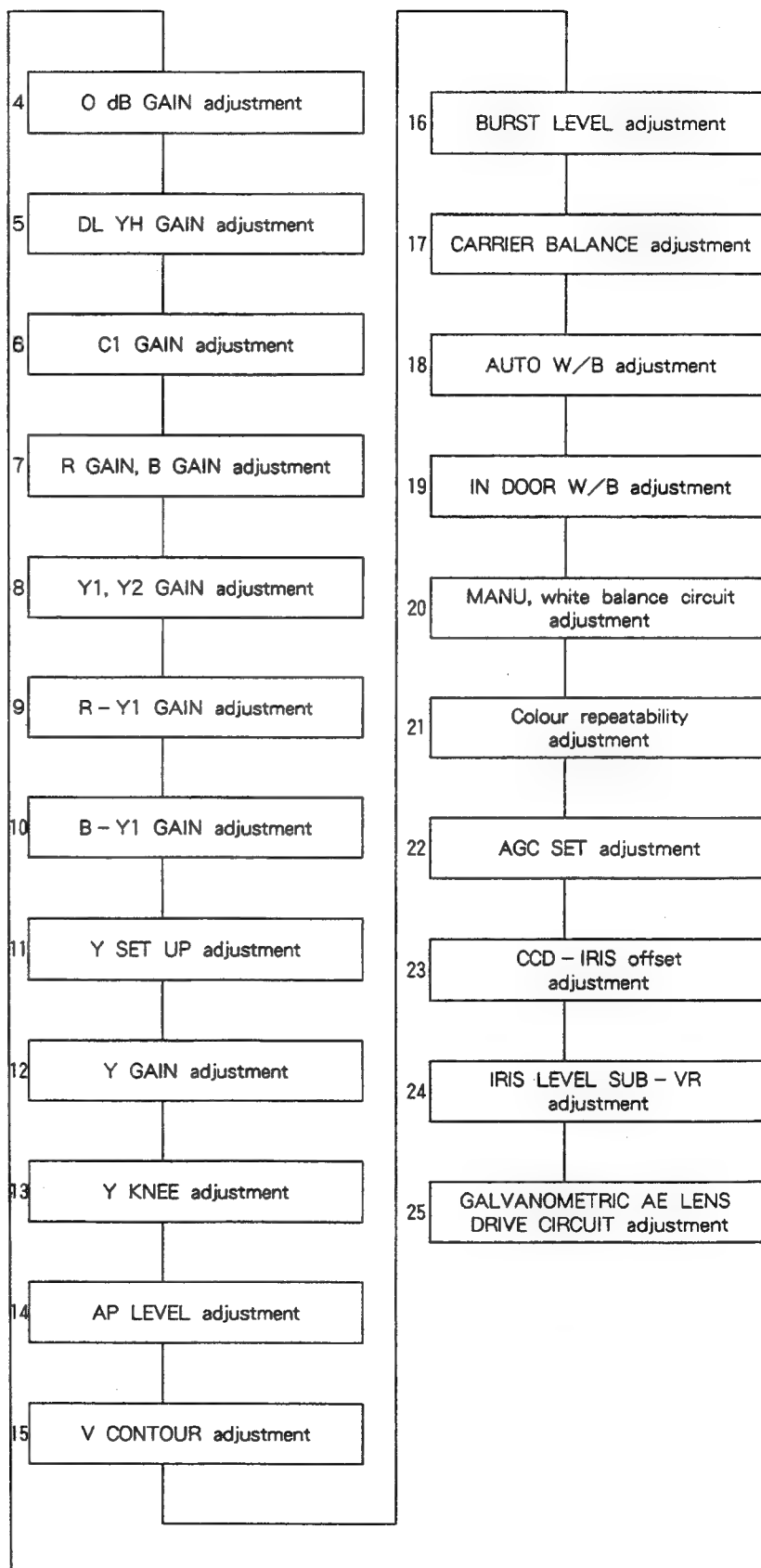
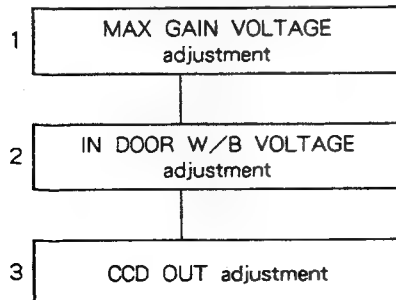
2. Adjusting the SSG



3. Adjusting the CCD



4. Adjusting the Signal System




1. Adjusting the Voltage

No.	Item	Instrument	Test point	Control	Procedure
1	5V adjustment	Digital voltmeter	TP - 2 (5V) [Mother board]	R11 (5V ADJ) [Mother board]	1. Connect digital voltmeter to TP - 2 (5V) 2. Set the voltage to 5.0V with R11 (5V ADJ).

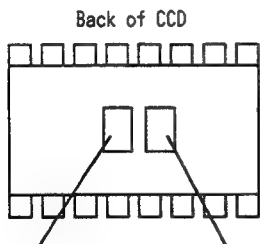
2. Adjusting the SSG

No.	Item	Instrument	Test point	Control	Procedure
1	28M frequency adjustment	Oscilloscope	TP - 17 [CDS/TG board]	R54 VR (28MADJ) [CDS/TG board]	1. Connect a frequency counter to TP - 17. 2. Adjust the frequency to $28.6375 \text{ MHz} \pm 10 \text{ Hz}$ with R54 (28MADJ).
2	G/L f_H control voltage adjustment	Oscilloscope	TP - 18 [CDS/TG board] (or TP - 1 [SSG/GEN board])	R60 (f_H) [CDS/TG board]	1. Connect an oscilloscope probe to TP - 18. 2. Connect an external SYNC and establish GEN LOCK or LINE LOCK operation. 3. Adjust the voltage to $2.5\text{V} \pm 0.1\text{V}$ with R60 (f_H) VR.
3	G/L fsc control voltage adjustment	Oscilloscope	TP - 2 [SSG/GEN board]	R97 (4 fsc) [SSG/GEN board]	1. Connect an oscilloscope probe to TP - 2. 2. Connect an external SYNC and establish GEN LOCK or LINE LOCK operation. 3. Adjust voltage to $3\text{V} \pm 0.1\text{V}$ with R97 (4 fsc) VR.

3. Adjusting the CCD

No.	Item	Instrument	Test point	Control	Procedure
1	V _{sub} adjustment	Digital voltmeter	TP - 2 [IMEGER board]	R14 (V _{sub}) [IMEGER board]	<div>1. Connect a digital voltmeter to TP - 2.</div> <div>2. Set an imager-specified voltage V_{sub} with R14 (V_{sub}).</div> <div>■ The specified voltage is indicated on the back of CCD. See the box below : How to compute the specified voltages.</div>
2	RESET GATE adjustment	Oscilloscope	TP - 3 [IMEGER board]	R2 (RG) [IMEGER board]	<div>1. Connect an oscilloscope to TP - 3.</div> <div>2. Set the reset gate pulse low level to an image-specified voltage VRGL with R2 (RG).</div> <div>■ The specified voltage is indicated on the back of CCD. SEE the box below : How to compute the specified voltages.</div> <div></div>

How to compute thespecified voltages



This indicates VRGL. This indicates VSUB.

The mnemonics correspond to the actual values as follows :

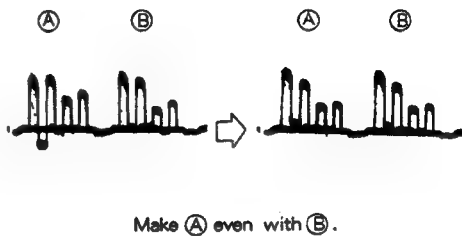
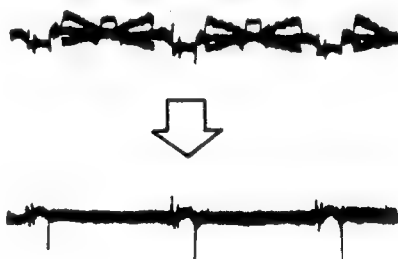

VRGL mnemonic	1	2	3	4	5	6	7
Actual value	1.0	1.5	2.0	2.5	3.0	3.5	4.0


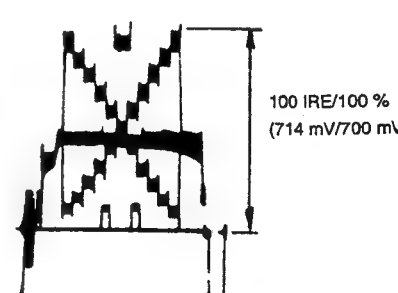
VSUB mnemonic	E	f	G	h	J	K	L	m	N	P	Q	R	S	T	U	V	W	X	Y	Z
Actual value	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5

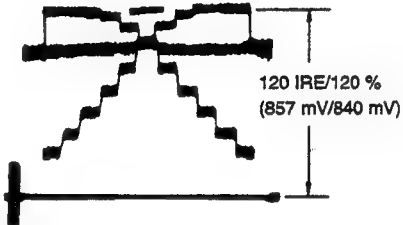
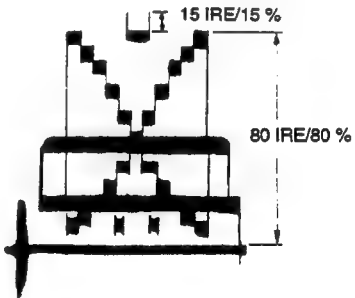
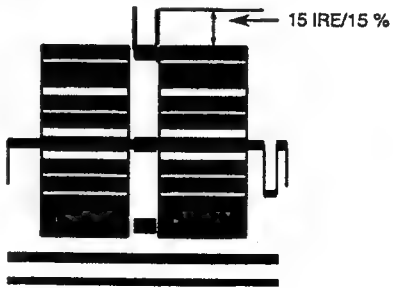
Example : "5L" means VRGL = 3.0V and VSUB = 12.0V

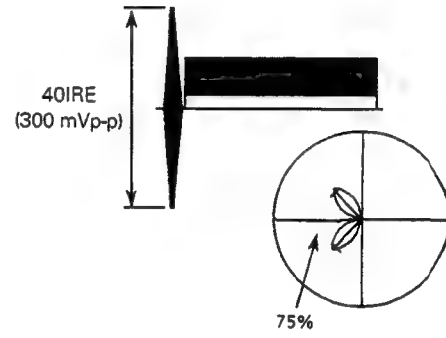
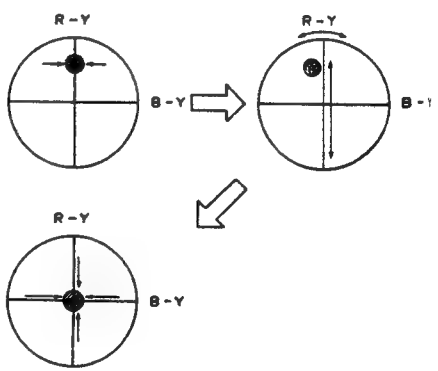
4. Adjusting the signal system

No.	Item	Instrument	Test point	Control	Procedure
1	MAX GAIN VOLTAGE adjustment	Digital voltmeter	TP - 1 (MAX GAIN) [CDS/TG board]	R5 (MAX GAIN) [CDS/TG board]	1. Connect a digital voltmeter to TP - 1 (MAX GAIN). 2. Set the voltage to 4.5V with R5 (MAX GAIN).
2	IN DOOR W/B VOLTAGE adjustment	Digital voltmeter	TP-101 (R CTL) TP-102 (B CTL) [FEATURE board]	R141 (R CTL) R142 (B CTL) [FEATURE board]	1. Connect a digital voltmeter to TP - 101 (R CTL). 2. Set the TP - 101 voltage to 4.00V with R141 (R CTL). 3. Connect the digital voltmeter to TP - 102 (B CTL). 4. Set the TP - 102 voltage to 4.20V with R142 (B CTL).
3	CCD OUT adjustment	Oscilloscope, Gray scale	TP - 1 (CCD OUT) [IMEGER board]	Lens iris	1. Connect an oscilloscope to TP - 1 (CCD OUT). 2. Set the CCD OUT to 170mVp-p (TK-1280), 200 mVp-p (TK1180) with the lens iris VR. <div> </div>
4	0dB GAIN adjustment	Oscilloscope, Gray scale	TP - 3 (Y out) [CDS/TG board]	R8 (0dB GAIN) [CDS/TG board]	● CCD OUT: 170mV (TK-1280), 200mV (TK-1180) 1. Connect an oscilloscope to TP - 3 (Y OUT). 2. Adjust the voltage to 200mV with R8 (0dB GAIN). <div> </div>
5	DL YH GAIN adjustment	Oscilloscope, Gray scale	TP - 1 (Y1 - Y0) [MAT/ENC board]	R46 (DL YH GAIN) [MAT/ENC board]	● CCD OUT: 170mV (TK-1280), 200mV (TK-1180) 1. Connect an oscilloscope to TP - 1 (Y1 - Y0). 2. Use R46 (DL YH GAIN) to adjust the waveform so that it may become flat. <div> </div>

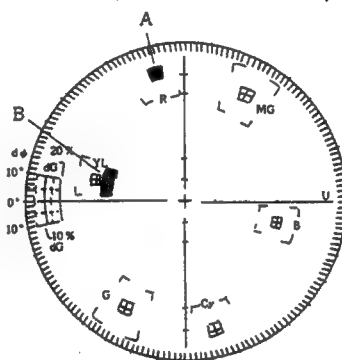
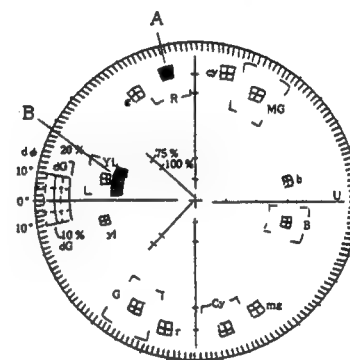
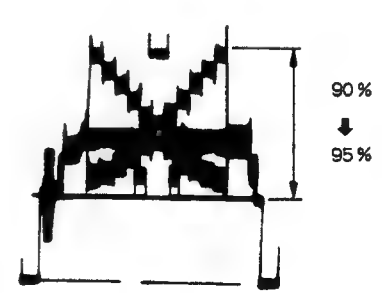
No.	Item	Instrument	Test point	Control	Procedure
6	C1 GAIN adjustment	Oscilloscope, Color bars	TP - 3 (B) [MAT/ENC board]	R8 (C1 GAIN) [MAT/ENC board]	<p>● CCD OUT: 340mV (TK-1280), 400mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 3 (B). 2. Match the YL level for each 1H with R8 (C1 GAIN).  <p>Make A even with B.</p>
7	R GAIN, B GAIN adjustment	Oscilloscope, Gray scale	TP - 6 (R-YO) TP - 8 (B-YO) [MAT/ENC board]	R21 (R GAIN) R23 (B GAIN) [MAT/ENC board]	<p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 6 (R-YO). 2. Use R GAIN VR (R21) to adjust the TP - 6 waveform so that it may become flat. 3. Connect the oscilloscope to TP - 8 (B-YO). 4. Use B GAIN VR (R23) to adjust the TP - 8 waveform so that it may become flat. 
8	Y1, Y2 GAIN adjustment	Oscilloscope, Gray scale	TP - 2 (VAP) [MAT/ENC board]	R3 (Y1, Y2 GAIN) [MAT/ENC board]	<p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 2 (VAP). 2. Match the overshoot and pre-shoot level with R3 (Y1, Y2 GAIN). 

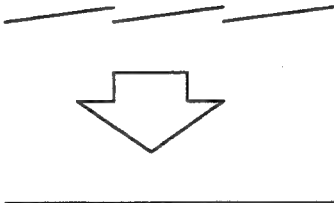
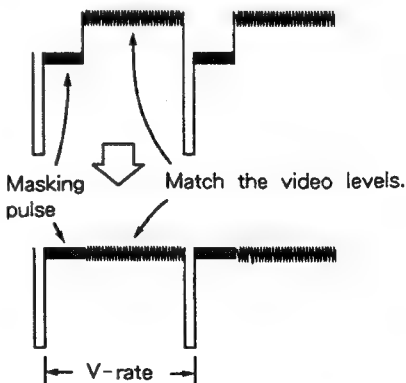
No.	Item	Instrument	Test point	Control	Procedure
9	R - Y1 GAIN adjustment	Oscilloscope, Color bars	TP - 6 (R - Y0) TP - 7 (R - Y1) [MAT/ENC board]	R77 (R - Y1 GAIN) [MAT/ENC board]	<p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect the oscilloscope 1CH to TP - 6 (R - Y0). 2. Connect the oscilloscope 2CH to TP - 7 (R - Y1). 3. Invert the 2CH waveform and add to 1CH. 4. Use R77 (R - Y1 GAIN) to adjust the waveform so that it may become flat.
10	B - Y1 GAIN adjustment	Oscilloscope, Color bars	TP - 8 (B - Y0) TP - 9 (B - Y1) [MAT/ENC board]	R85 (B - Y1 GAIN) [MAT/ENC board]	<p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect the oscilloscope 1CH to TP - 8 (B - Y0). 2. Connect the oscilloscope 2CH to TP - 9 (B - Y1). 3. Invert the 2CH waveform and add to 1CH. 4. Use R85 (B - Y1 GAIN) to adjust the waveform so that it may become flat.
11	Y SET UP adjustment	Oscilloscope	VIDEO OUT	R114 (Y SET UP) [MAT/ENC board]	<p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Adjust Y SET UP to 53.5 mV (NTSC) / 52.5 mV (PAL) with R114 (Y SET UP). (Waveform monitor : 7.5 IRE/7.5 %) 
12	Y GAIN adjustment	Waveform monitor or Oscilloscope, Gray scale	VIDEO OUT	R111 (Y GAIN) [MAT/ENC board]	<p>● CCD OUT: 170mV (TK-1280), 200mV (TK-1180)</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Reset the Y KNEE. 3. Adjust the video output to 714 mV (NTSC) / 700 mV (PAL) with R111 (Y GAIN). (Waveform monitor : 100 IRE/100 %) 4. Y KNEE adjustment. 

No.	Item	Instrument	Test point	Control	Procedure
13	Y KNEE adjustment	Waveform monitor or Oscilloscope	VIDEO OUT	R181 (Y KNEE) [MAT/ENC board]	<p>● IRIS : OPEN</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Adjust the white peak to 857 mV (NTSC) / 840 mV (PAL) with R181 (Y KNEE). (Waveform monitor : 120 IRE/120 %) 
14	AP LEVEL adjustment	Waveform monitor or Oscilloscope, Gray scale	VIDEO OUT	R107 (APL) [MAT/ENC board]	<p>● VIDEO OUT : 80 IRE/80 %</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Make sure the focus is correct. 3. Adjust the overshoot of the white peak at the gray scale center to 10mV with R107 (APL). (Waveform monitor : 15 IRE/15 %) 
15	V CONTOUR adjustment	Waveform monitor or Oscilloscope, Gray scale	VIDEO OUT	R43 (VAP) [MAT/ENC board]	<p>● VIDEO OUT : 80 IRE/80 %</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Make sure the focus is correct. 3. Adjust the overshoot of the white peak at the gray scale center to 10mV with R43 (VAP). (Waveform monitor : 15 IRE/15 %) 

No.	Item	Instrument	Test point	Control	Procedure
16	BURST LEVEL adjustment	Waveform monitor, Vectorscope, or Oscilloscope	VIDEO OUT	R102 (BURST LEVEL) [MAT/ENC board]	<p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor, vectorscope, or oscilloscope to the video output. 2. Adjust the burst to 286 mV (NTSC) / 300 mV (PAL) with R102 (BURST LEVEL). (Vectorscope : 75 %) 
17	CARRIER BALANCE adjustment	Vectorscope	VIDEO OUT	R92 (R-Y) R93 (B-Y) [MAT/ENC board]	<p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect a vectorscope to the video output. 2. Use R92 (R-Y) and R93 (B-Y) to adjust the carrier balance so that it may come to the vectorscope center. 

No.	Item	Instrument	Test point	Control	Procedure
18	AUTO W/B adjustment	Vectorscope, Gray scale, C10 + C8 filter, W4 + W2 filter, CC - 12G filter	VIDEO OUT	R203 (A WB R) R202 (A WB B) [FEATURE board]	<p>● VIDEO OUT : 100 %</p> <ol style="list-style-type: none"> 1. Use R203 (A WB R) and R202 (A WB B) to adjust a rosette of the vectorscope so that it may come to the center. 2. Set the white balance SW to AUTO. 3. Use R203 (A WB R) and R202 (A WB B) to adjust a rosette of the vectorscope so that it may come to the center. 4. Apply each of the C10 + C8, W4 + W2, CC - 12G filters and check a white balance is established. (If not, adjust the white balance with R21 (R GAIN) and R23 (B GAIN). 5. Reset the white balance SW to IN DOOR.
19	IN DOOR W/B adjustment	Vectorscope, Gray scale	VIDEO OUT	R21 (R GAIN) R23 (B GAIN) [MAT/ENC board]	<p>● VIDEO OUT : 100 %</p> <ol style="list-style-type: none"> 1. Connect a vectorscope to the video output. 2. Use R141 (RCTL) and R142 (BCTL) to adjust a rosette of the vectorscope so that it may come to the center.
20	MANU, white balance circuit adjustment	Oscilloscope, Gray scale, C12 filter	VIDEO OUT	R136 (G - Mg) R122 (R - B) R127 (R OFFSET) R130 (R GAIN) [FEATURE board]	<p>● VIDEO OUT : 100 %</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor, vectorscope to the video output. 2. Set the white balance SW to MANUAL. 3. Set R136 (G - Mg) to the center. 4. Shoot the gray scale under the 3200°K light source. 5. Adjust the white balance with R122 (R - B) and R127 (R OFFSET). 6. Fit a C12 filter and shoot the gray scale. 7. Adjust the white balance with R122 (R - B) and R130 (R GAIN) 8. Repeat steps 4 to 7 once or twice more. 9. Reset the white balance SW to IN DOOR.


No.	Item	Instrument	Test point	Control	Procedure
21	Colour repeatability adjustment	Vectorscope, Colour bars	Video out	R55 (R - Y HUE) R54 (B - Y HUE) R51 (R - Y GAIN) R53 (B - Y GAIN) [MAT/ENC board]	<p>● VIDEO OUT :100 IRE/100%</p> <ol style="list-style-type: none"> 1. Connect a vectorscope to the video output. 2. Adjust the R axis to a required position A with R55 (R - Y HUE). 3. Adjust the YL axis to a required position B with R54 (B - Y HUE). 4. Adjust the R saturation to a specified position with R51 (R - Y GAIN). 5. Adjust the YL saturation to a specified position with R53 (B - Y GAIN).
				 <p>NTSC</p>  <p>PAL</p>	
22	AGC SET adjustment	Waveform monitor or Oscilloscope, Gray scale	VIDEO OUT	R14 (AGC SET) [CDS/TG board]	<p>● VIDEO OUT : 90 IRE/90%</p> <ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Turn the AGC SW to ON and adjust the output to 95 IRE/95 % with R14 (AGC SET).
					

No.	Item	Instrument	Test point	Control	Procedure
23	CCD - IRIS offset adjustment	Oscilloscope,	TP - 301 (CCD IRIS) [FEATURE board]	R310 (CCD IRIS) [FEATURE board]	<p>● IRIS : CLOSED</p> <ol style="list-style-type: none"> 1. Connect an oscilloscope to TP - 301 (CCD IRIS). (5ms/div, 0.2V/div DC) 2. Use R310 (CCD IRIS) to adjust the TP - 301 (CCD IRIS) so that it may become flat. 
24	IRIS LEVEL SUB - VR adjustment	Waveform monitor or Oscilloscope, Gray scale	VIDEO OUT	R22 (IRIS LEVEL) [CDS/TG board]	<ol style="list-style-type: none"> 1. Connect a waveform monitor or oscilloscope to the video output. 2. Shoot the gray scale cross point at 70 to 100 IRE/100 %. 3. Set the SHUTTER mode SW to "CCD - IRIS" position. 4. Adjust the gray scale to 100 IRE/100 % with R22 (IRIS LEVEL). (NTSC : 714mV, PAL : 700mV)
25	GALVANO-METRIC AE LENS DRIVE CIRCUIT adjustment	Oscilloscope, White pattern, Galvanometric AE lens	VIDEO OUT or TP - 4 [CDS/TG board]	R116 (ALC) R113 (GAIN) [FEATURE board]	<ol style="list-style-type: none"> 1. Fit a galvanometric AE lens. 2. Turn ON the BLC switch. 3. Connect a waveform monitor or oscilloscope to the video output. 4. Connect the oscilloscope to the auto iris terminal output. (V - rate 200 mV/div.) 5. Set R116 (ALC) to the center. 6. Make the auto iris terminal output level flat with R113 (GAIN). (Match the video level with the masking pulse level.) 

STANDARD CIRCUIT DIAGRAMS AND BOARDS

■ NOTE ON USING CIRCUIT DIAGRAMS


1. SAFETY

The components identified by the  symbol and shading are critical for safety. For continued safety replace safety critical components only with manufactures recommended parts.

2. SPECIFIED VOLTAGE AND WAVEFORM VALUES

The voltage and waveform values have been measured under the following conditions.

(1) Camera head

- Illumination : Illumination condition during standard adjustment
- Object : JVC Gray scale pattern ($\gamma = 2.2$, 11 steps)
- Iris : Set the VIDEO OUT wave form level to 714 mV_{PD-WP} (AGC OFF) with IRIS switch (at the lens side)
- Switch : AGC = OFF
SHUTTER = NORM
WHITE BALANCE =  (AUTO)

(2) Voltage values : All DC voltage values

(3) Waveform : Usually a probe of 10:1 is used

3. INDICATION OF PARTS SYMBOL [EXAMPLE]

- In the PW board: CAS-1502A
R1001 → R1 or R01
C1023 → C23
- Module PW board: CAS-A502A
ICA001 → IC1
QA023 → Q23

4. COLOR OF P.C. BOARD PATTEN

-  : Top side
-  : Bottom side

5. INDICATIONS ON THE CIRCUIT DIAGRAM

(1) Resistors

- Resistance value
 - No unit : $[\Omega]$
 - K : $[K\Omega]$
 - M : $[M\Omega]$
- Rated allowable power
 - No indication : 1/10 [W]
 - Others : As specified
- Type
 - No indication : Carbon resistor or Chip resistor
 - OMR : Oxide metal film resistor
 - FR : Fusible resistor






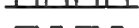
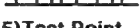




(2) Capacitors

- Capacitance value
 - 1 or higher : $[\mu F]$
 - less than 1 : $[pF]$
- Withstand voltage
 - No indication : DC50 [V]
 - Others : DC withstand voltage [V]
 - AC indicated : AC withstand voltage [V]
- Electrolytic Capacitors
 - 47/50 [Example]: Capacitance value $[\mu F]$ / withstand voltage [V]
- Type
 - No indication : Ceramic capacitor
 - MY : Mylar capacitor
 - PP : Polypropylene capacitor
 - TF : Thin film capacitor
 - BP : Bipolar electrolytic capacitor
 - TAN : Tantalum capacitor

(3) Coils

- No unit : $[\mu H]$
- Others : As specified

(4) Power Supply

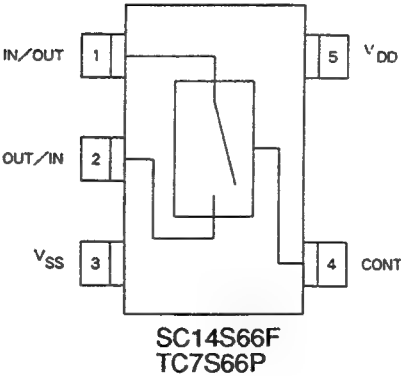
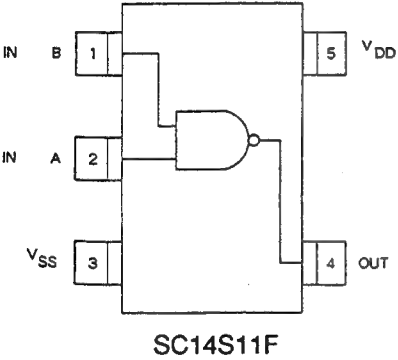
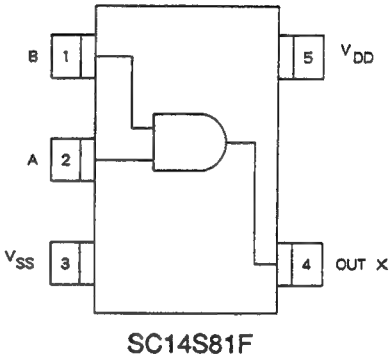
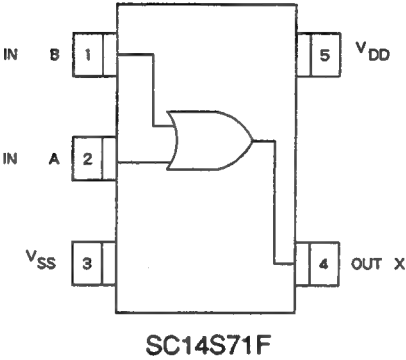
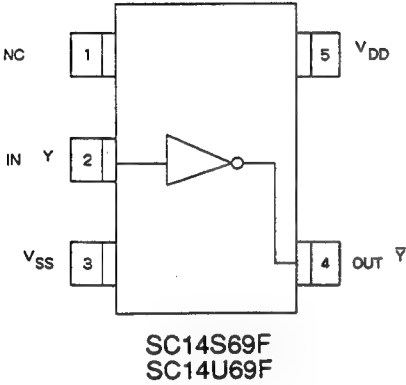
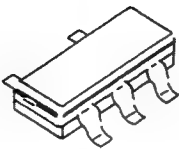
-  : +15V
-  : +12V
-  : +9.5V
-  : +8.5V
-  : +7V
-  : +5V
-  : -9V
-  : -10V
-  : -25V
-  : AC24V
-  : +17V

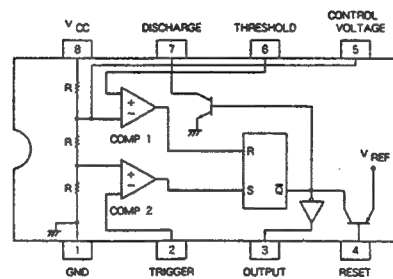
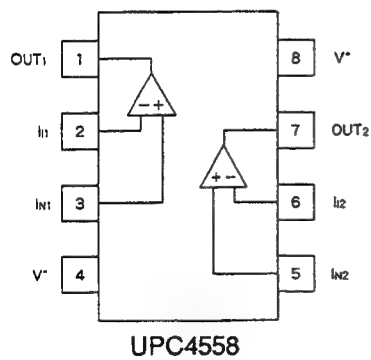
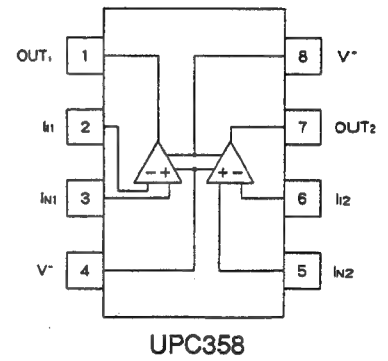
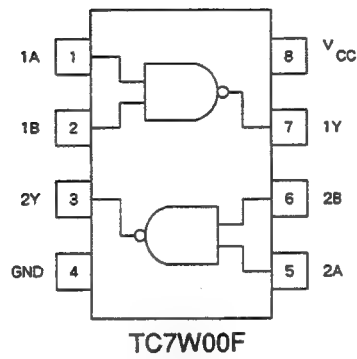
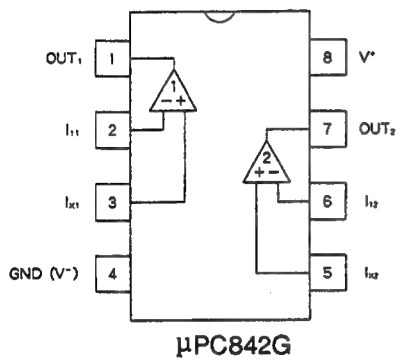
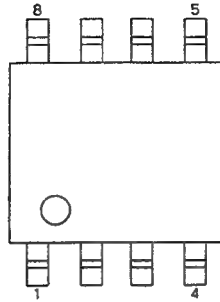
(5) Test Point

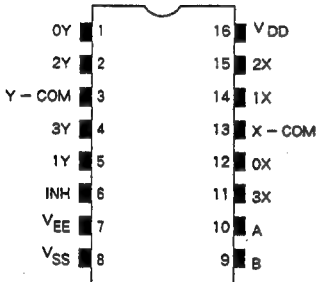
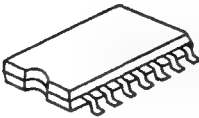


◇ Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.

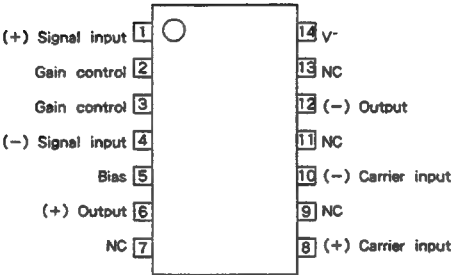
PIN ARRANGMENTS OF ICs AND TRANSISTORS



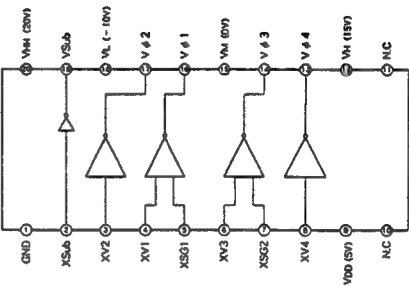




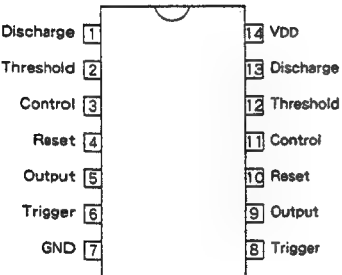
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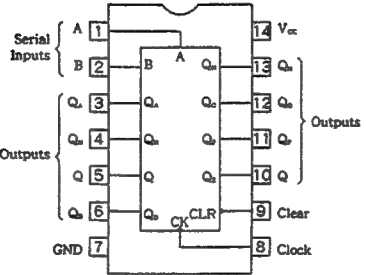
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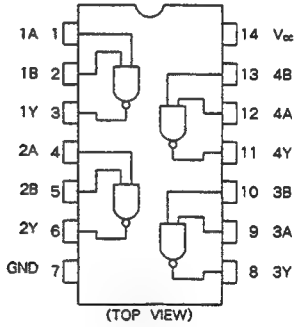
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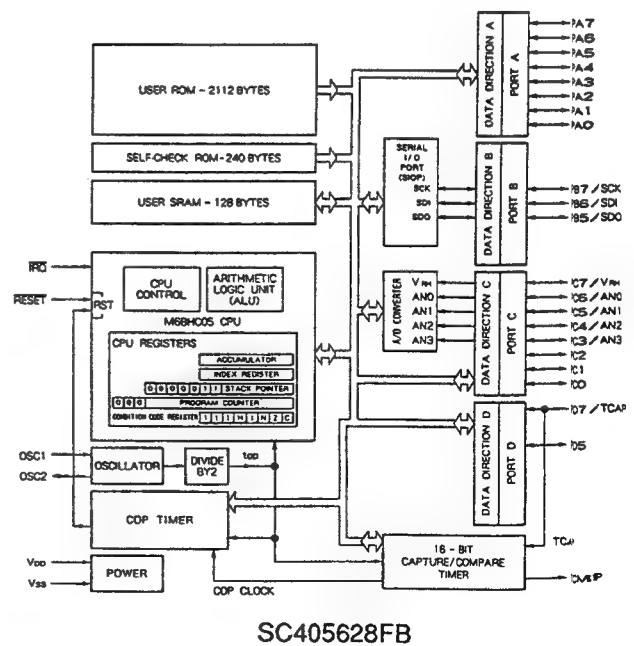
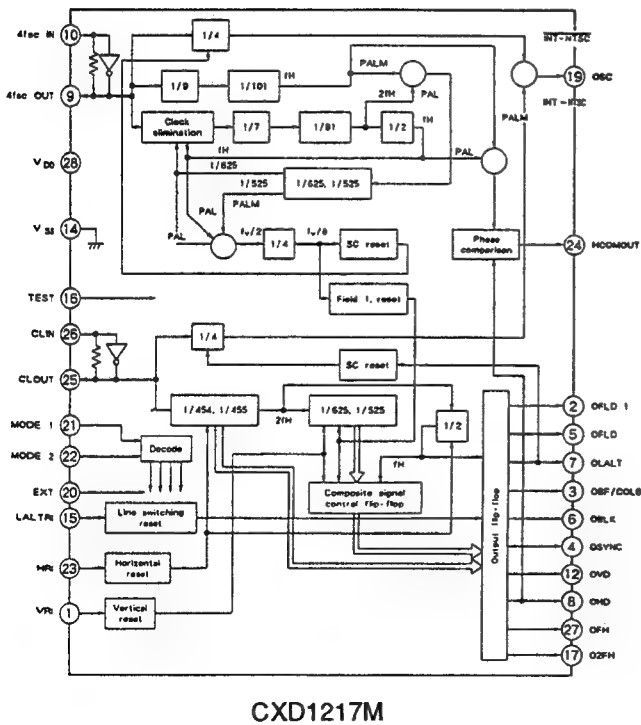
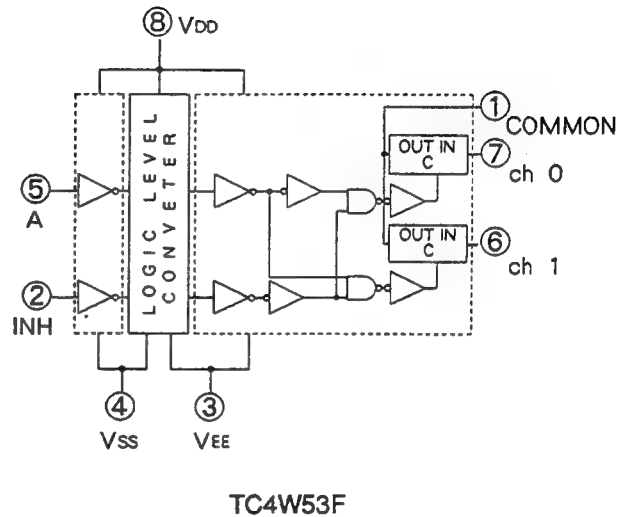
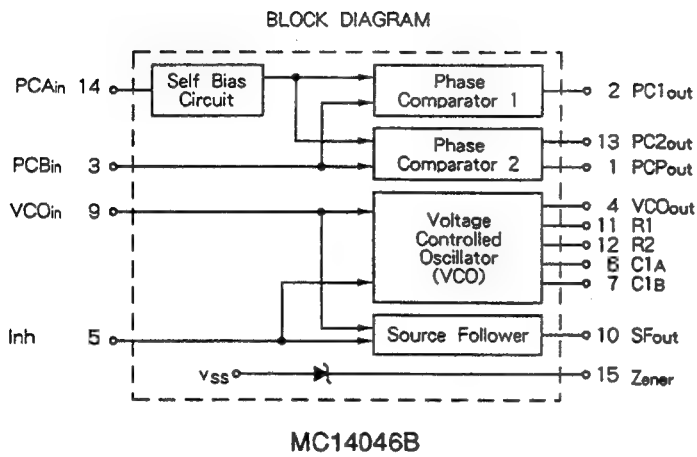
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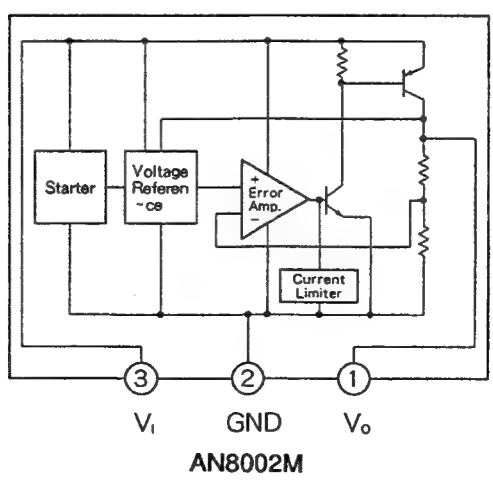
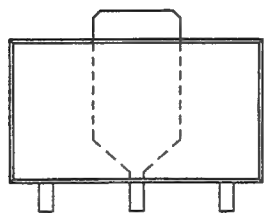
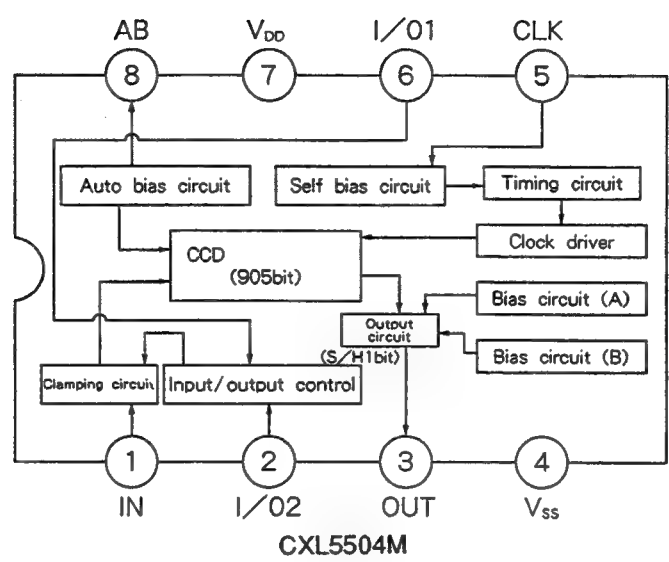


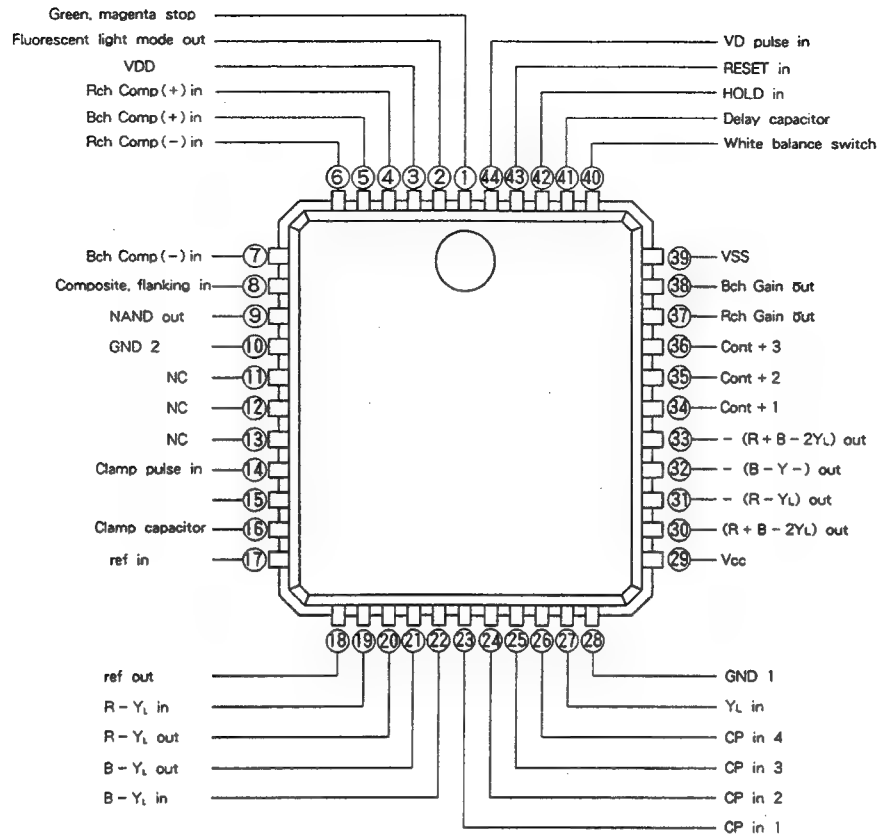
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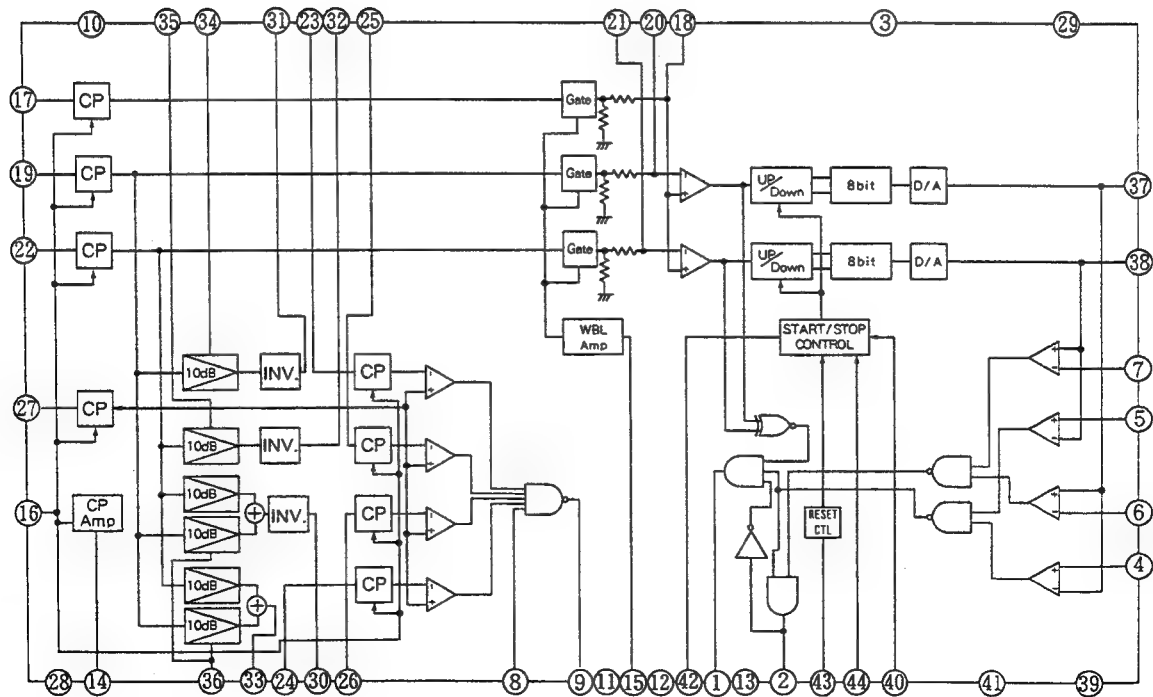
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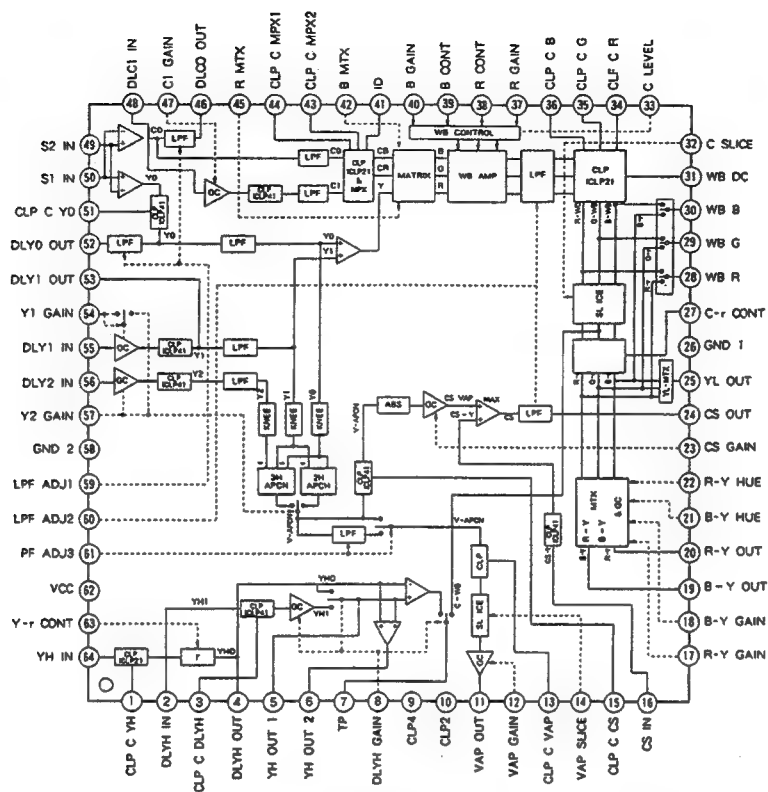


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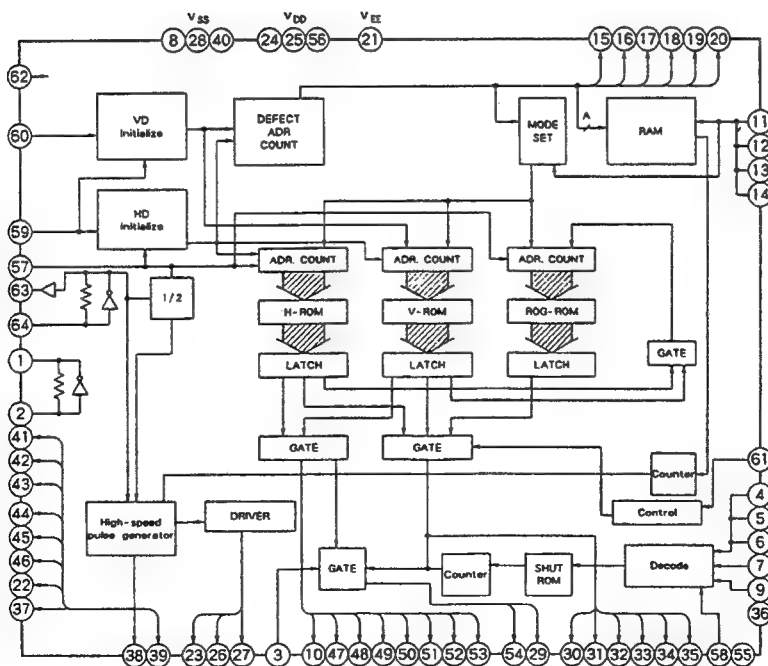


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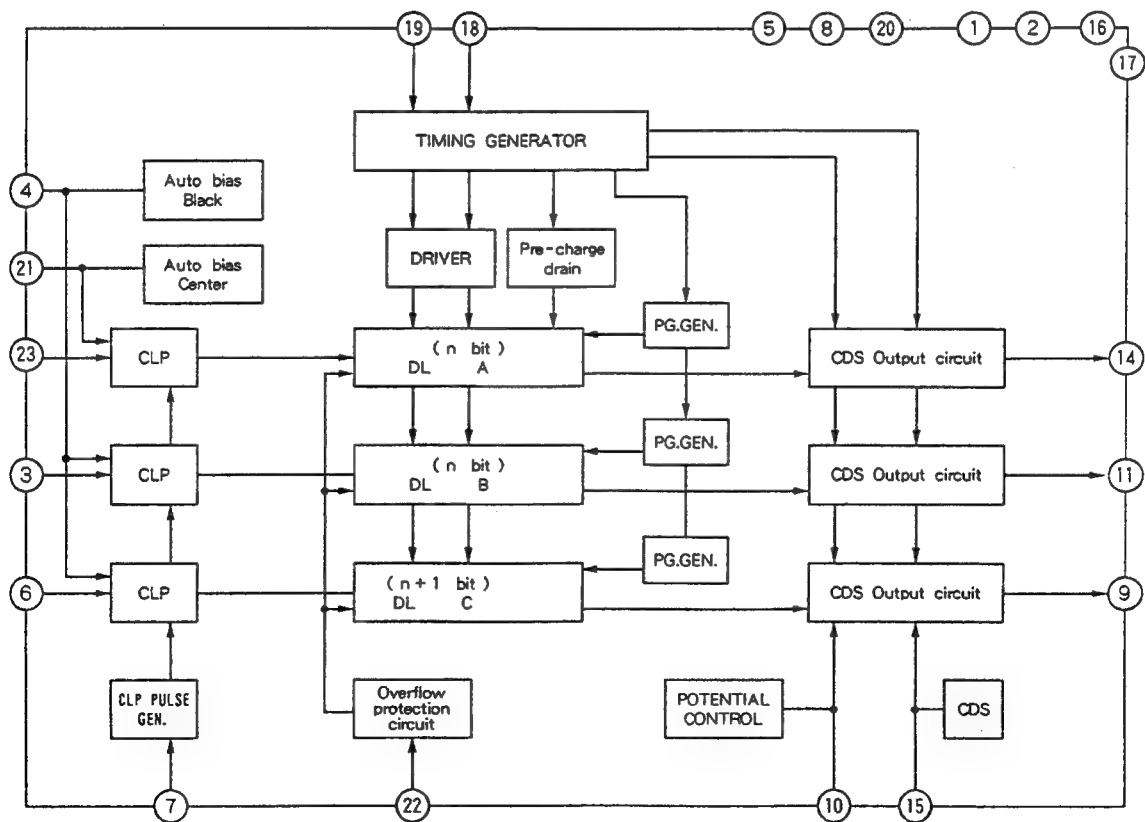
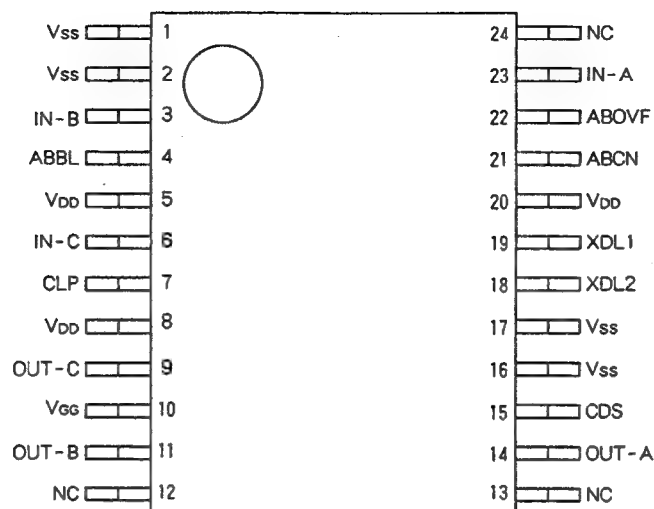




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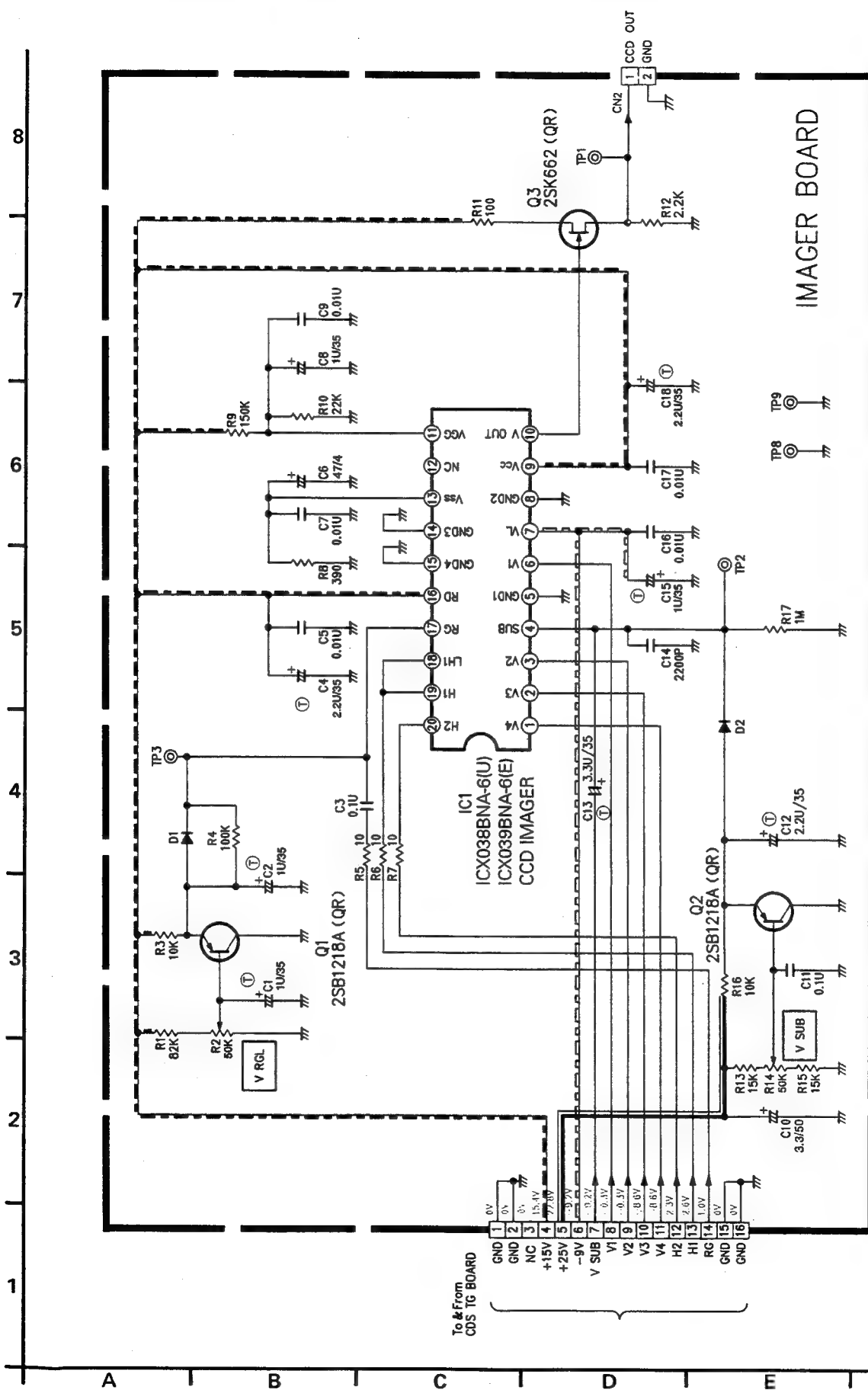


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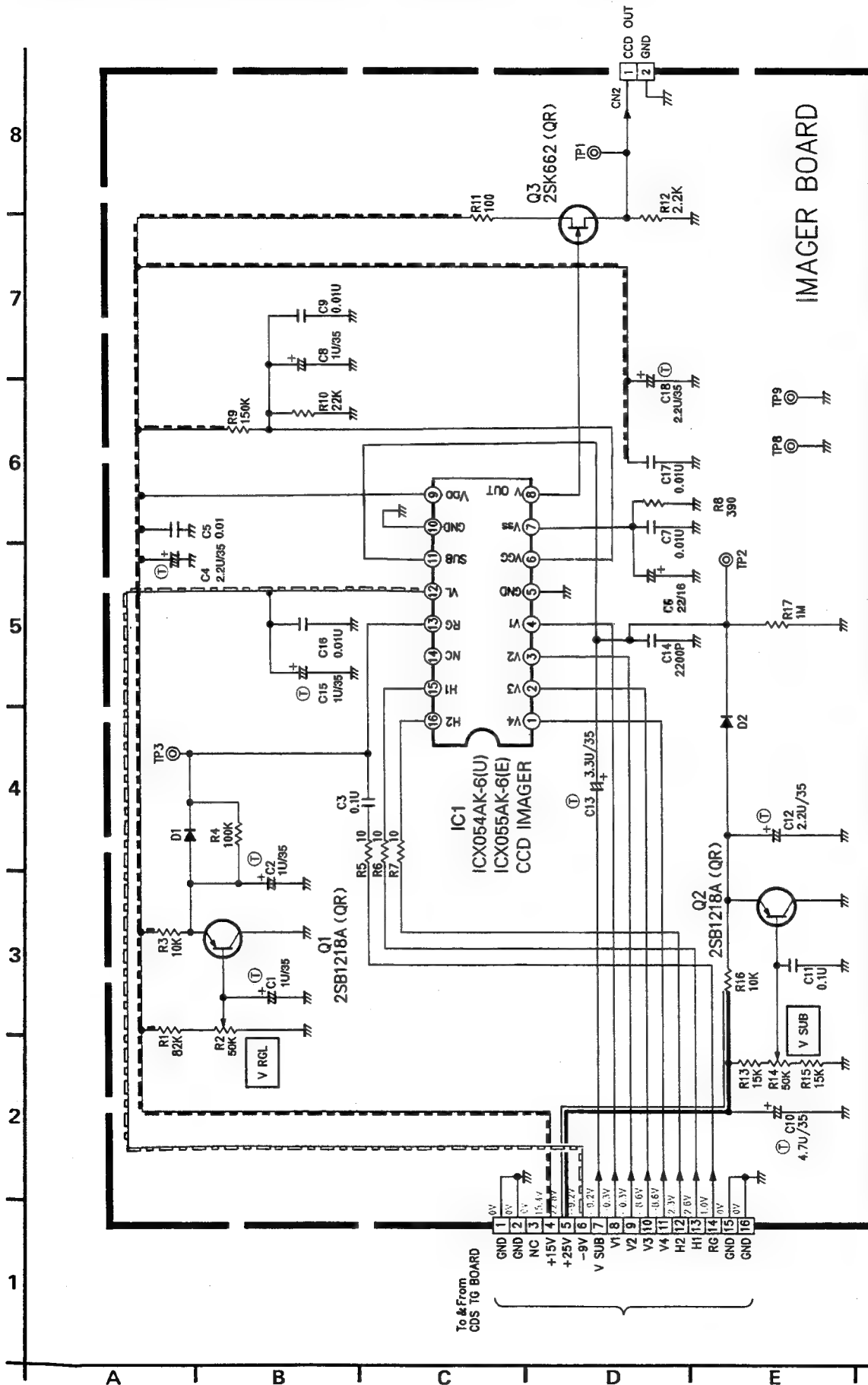


CX1517N

■ IMAGER BOARD CIRCUIT DIAGRAM (TK-1280/1281)

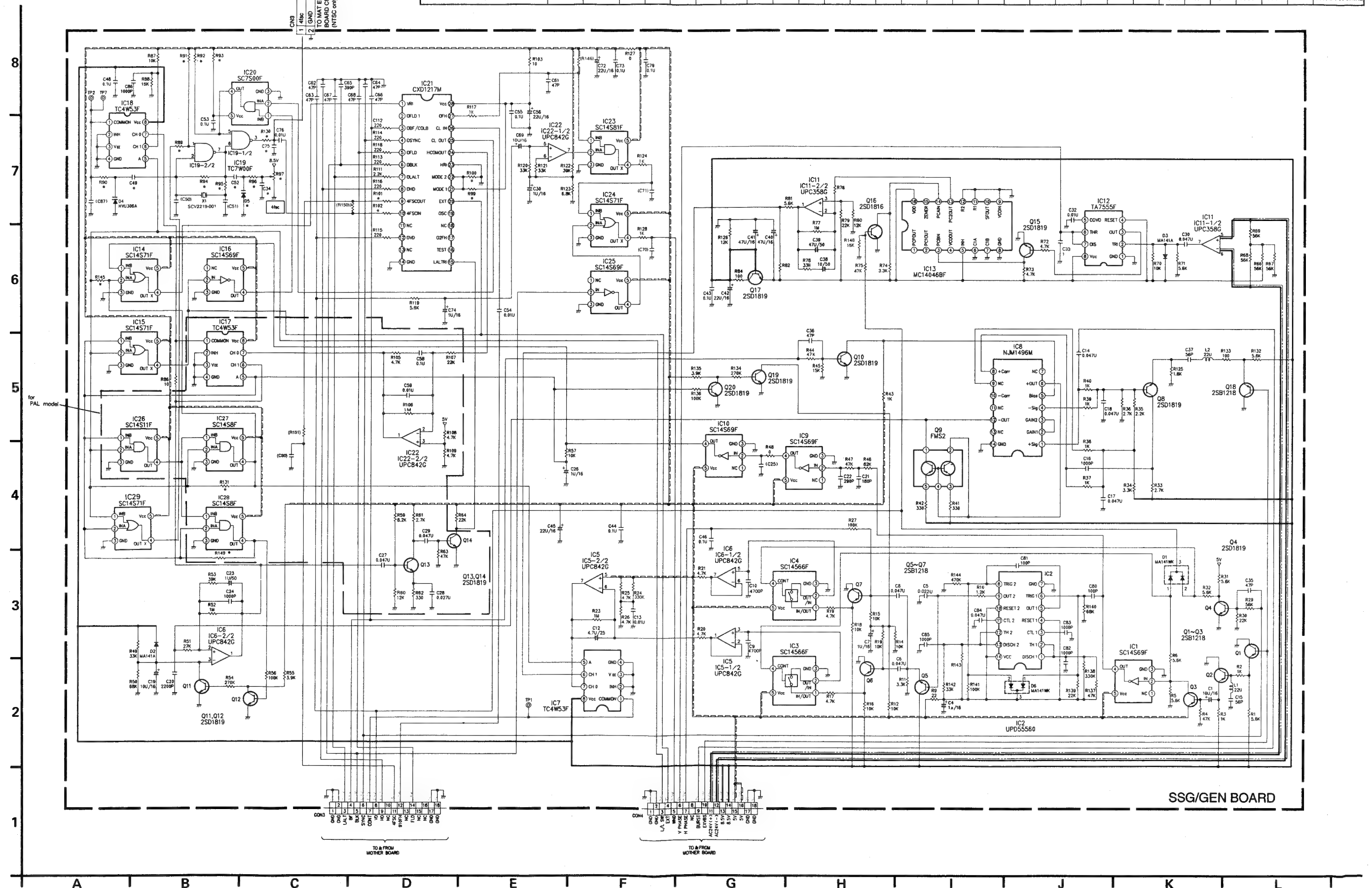


IMAGER BOARD CIRCUIT DIAGRAM (TK-1180)



SSG/GENLOCK BOARD CIRCUIT DIAGRAM

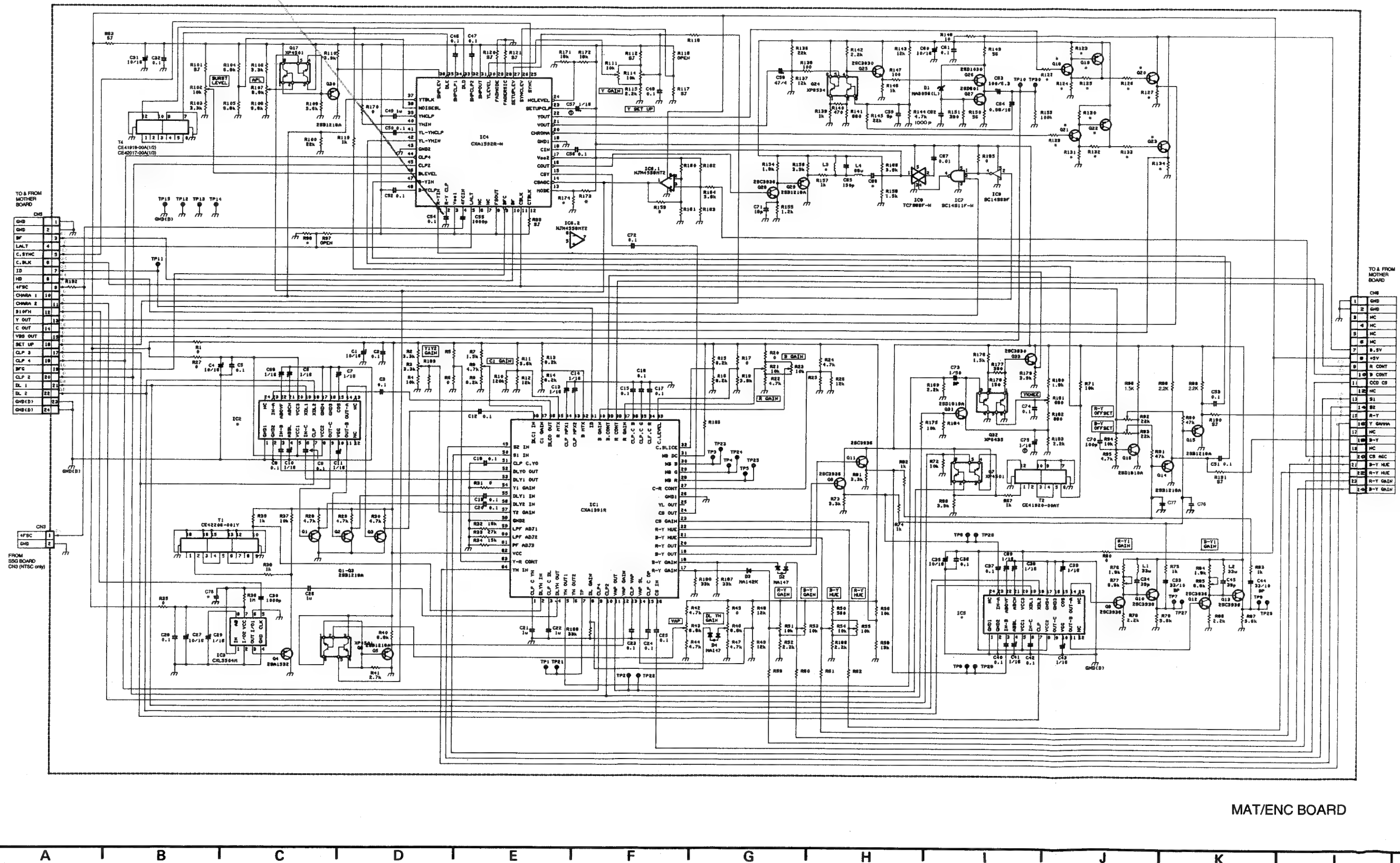
	IC29	D5	R87	R88	R89	R90	R91	R92	R93	R94	R95	R96	R97	R99	R100	R101	R102	R130	R131	R145	R149	C9	C10	C26	C34	C49	C52	C75	C86	X1
TK-1280JAPAN/U/TK-1180U	SC14S71F	HVU306A	10K	10K	SHORT	100K	—	—	150	1M	100	100K	10K	—	SHORT	—	—	1K	SHORT	—	SHORT	4700P	4700P	SHORT	0.01	33P	1000P	220K	1000P	14.31818MHz
TK-1280E/TK-1180E/TK-1281EG	—	HVU306A	10K	10K	—	100K	SHORT	SHORT	56	1M	220	100K	10K	SHORT	—	SHORT	SHORT	150	—	—	—	0.01	0.01	1/16	0.01	27P	1000P	100P	1000P	17.734475MHz



MAT/ENC BOARD CIRCUIT DIAGRAM

C54 ROT LAUFFWEG
TERMO

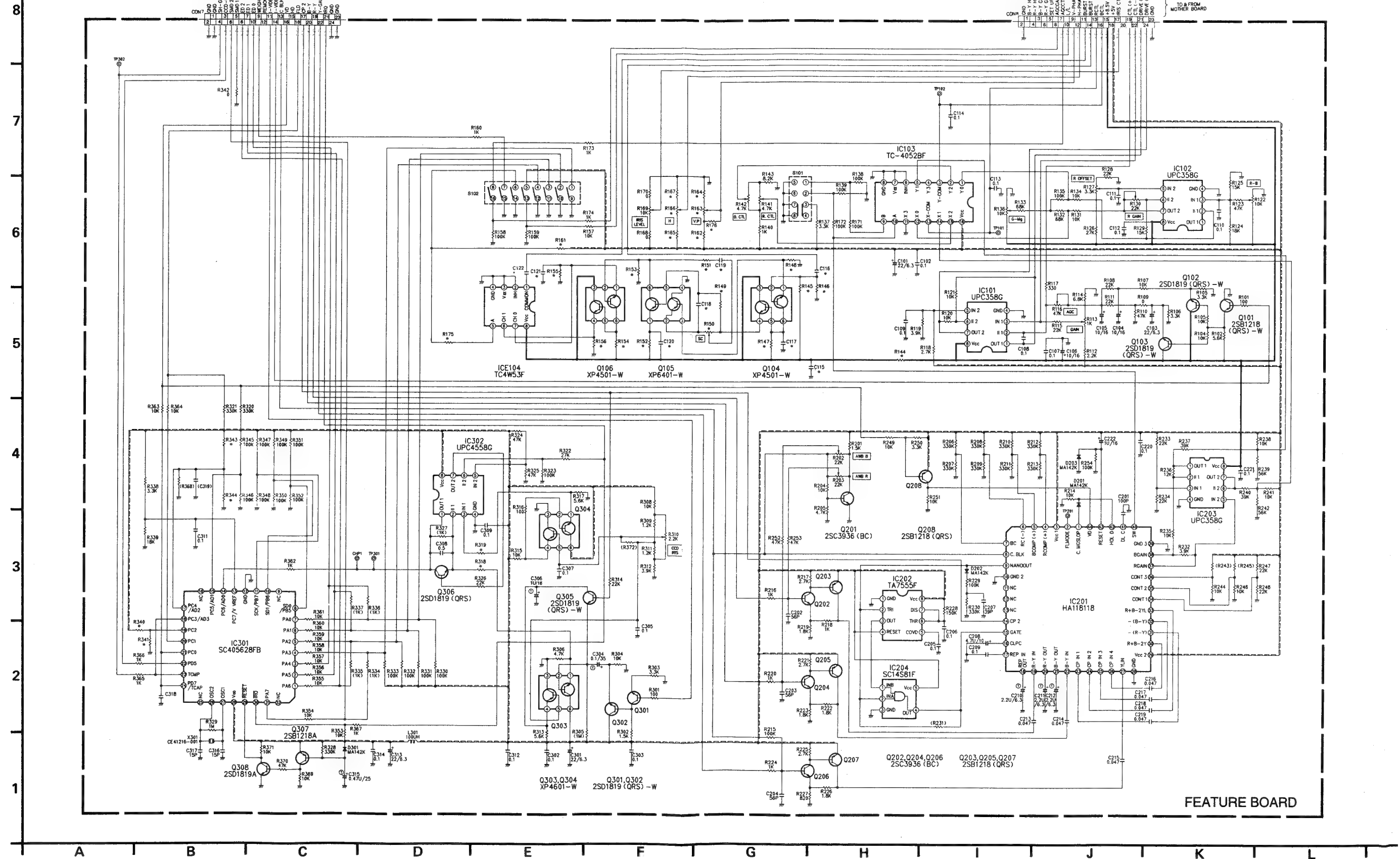
	IC2	IC5	L3	C66	R98	R173	R174	Q18	Q19	Q20,23	Q21	Q22	R122	R123	R124	R125	R126	R127	R129	R130	R131	R132	R133	R134	CN3	C78	C76	C77
TK-1280JAPAN/U	CXL1517N	CXL1517N	15 μ	33P	SHORT	—	SHORT	2SC3930(ABC)	2SA1532(ABC)	2SD1030(RS)	2SC3936(BC)	2SB1218A(QR)	100	2.7K	1.2K	1.2K	100	5.6K	100	2.7K	1.2K	1.2K	100	3.9K	USED	—	—	—
TK-1280E/TK-1281EG	CXL1517N	CXL1517N	8.2 μ	18P	—	SHORT	—	2SC3930(ABC)	2SA1532(ABC)	2SD1030(RS)	2SC3936(BC)	2SB1218A(QR)	100	2.7K	1.2K	1.2K	100	5.6K	100	2.7K	1.2K	1.2K	100	3.9K	NOT USED	—	—	—
TK-1180U	CXL1518N	CXL1518N	15 μ	33P	SHORT	—	SHORT	—	—	2SD1030(RS)	2SC3936(BC)	2SB1218A(QR)	—	—	—	—	—	—	100	2.7K	1.2K	1.2K	100	3.9K	USED	—	—	—
TK-1180E	CXL1518N	CXL1518N	8.2 μ	18P	—	SHORT	—	—	—	2SD1030(RS)	2SC3936(BC)	2SB1218A(QR)	—	—	—	—	—	—	100	2.7K	1.2K	1.2K	100	3.9K	USED	39P	220P	220P



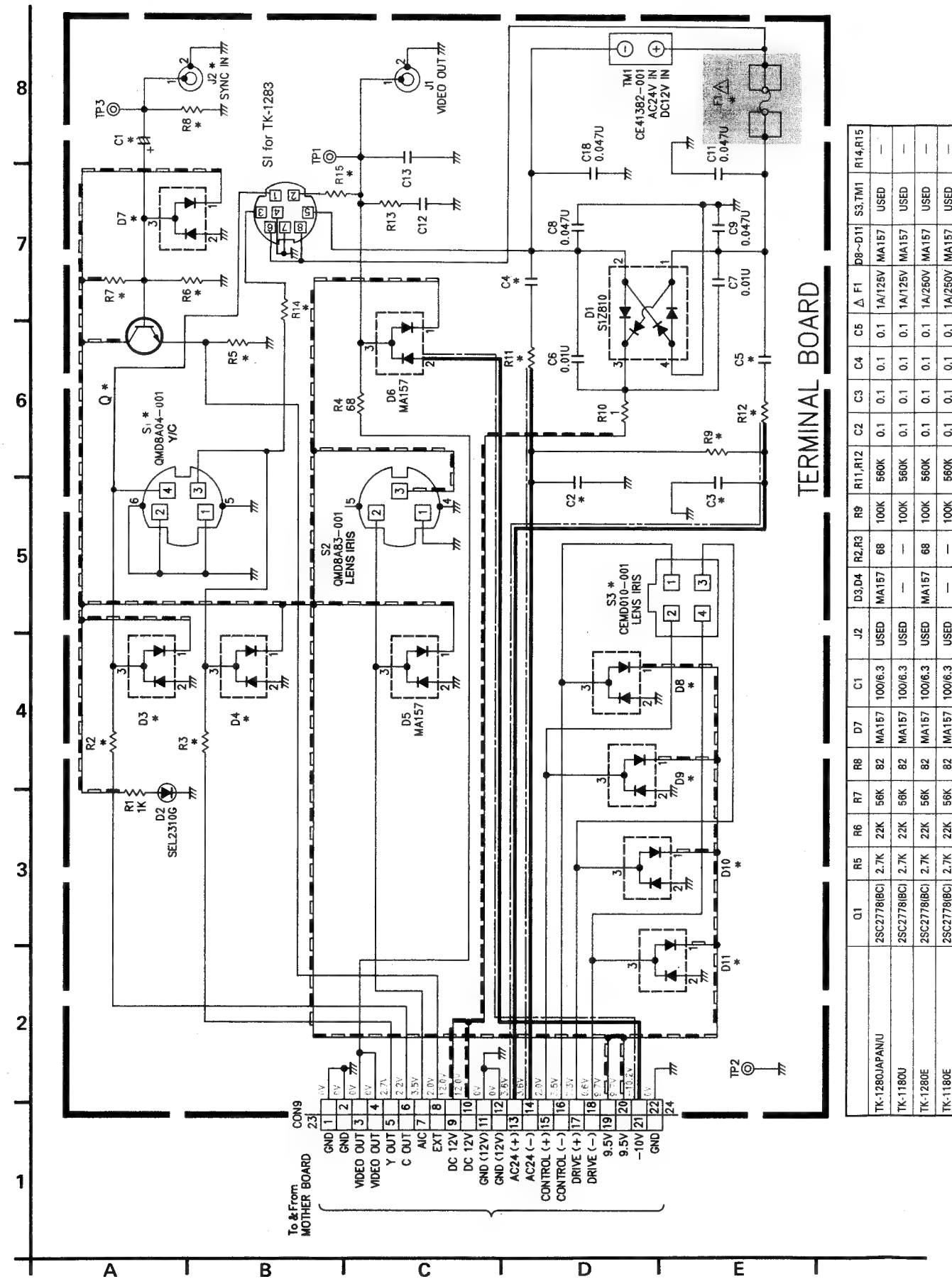
MAT/ENC BOARD

FEATURE BOARD CIRCUIT DIAGRAM

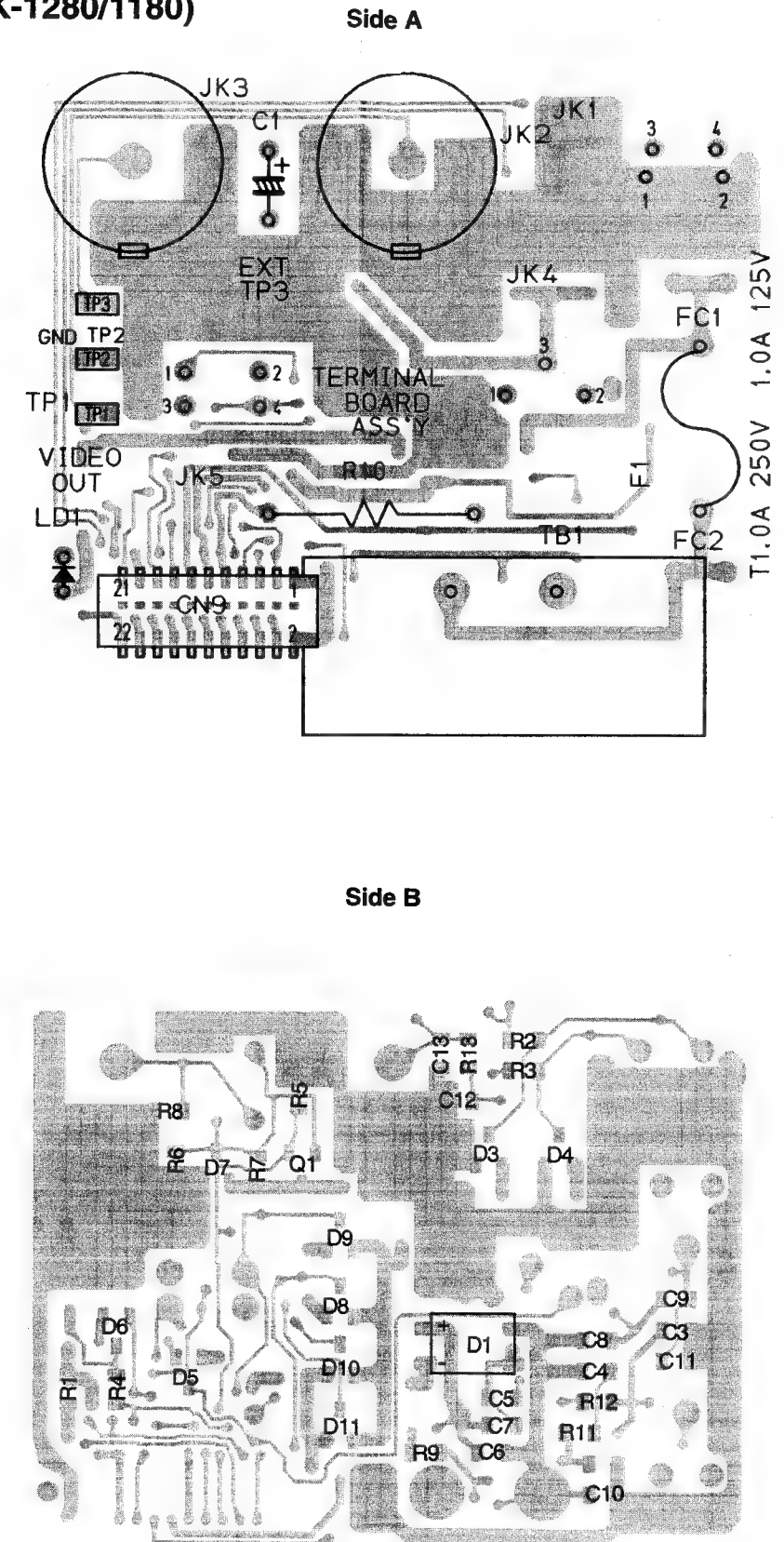
	R144	R145	R146	R147	R148	R149	R150	R151	R152	R153	R154	R155	R156	R161	R162	R163	R164	R165	R166	R167	R175	R176	R318	R319	R340	R341	R345	R346	C115	C116	C117	C118	C119	C120	C121	C122
TK-1280JAPAN/U	10	47K	15K	820	470	680	1K	SHORT	150	220	330	390	4.7K	47K	470	5K	—	1K	10K	2.7K	100K	22K	12K	12K	—	10K	—	100K	0.1	0.01	47P	68P	0.01	56P	10P	0.01
TK-1280E/TK-1281EG	10	47K	15K	820	470	680	1K	SHORT	150	220	330	390	4.7K	47K	470	5K	—	1K	10K	2.7K	100K	33K	15K	15K	10K	—	—	100K	0.1	0.01	47P	68P	0.01	56P	10P	0.01
TK-1180U	10	47K	15K	820	470	680	1K	SHORT	150	220	330	390	4.7K	47K	470	5K	—	1K	10K	2.7K	100K	22K	12K	12K	—	10K	100K	—	0.1	0.01	47P	68P	0.01	56P	10P	0.01
TK-1180E	10	47K	15K	820	470	680	1K	SHORT	150	220	330	390	4.7K	47K	470	5K	—	1K	10K	2.7K	100K	33K	15K	15K	10K	—	100K	—	0.1	0.01	47P	68P	0.01	56P	10P	0.01



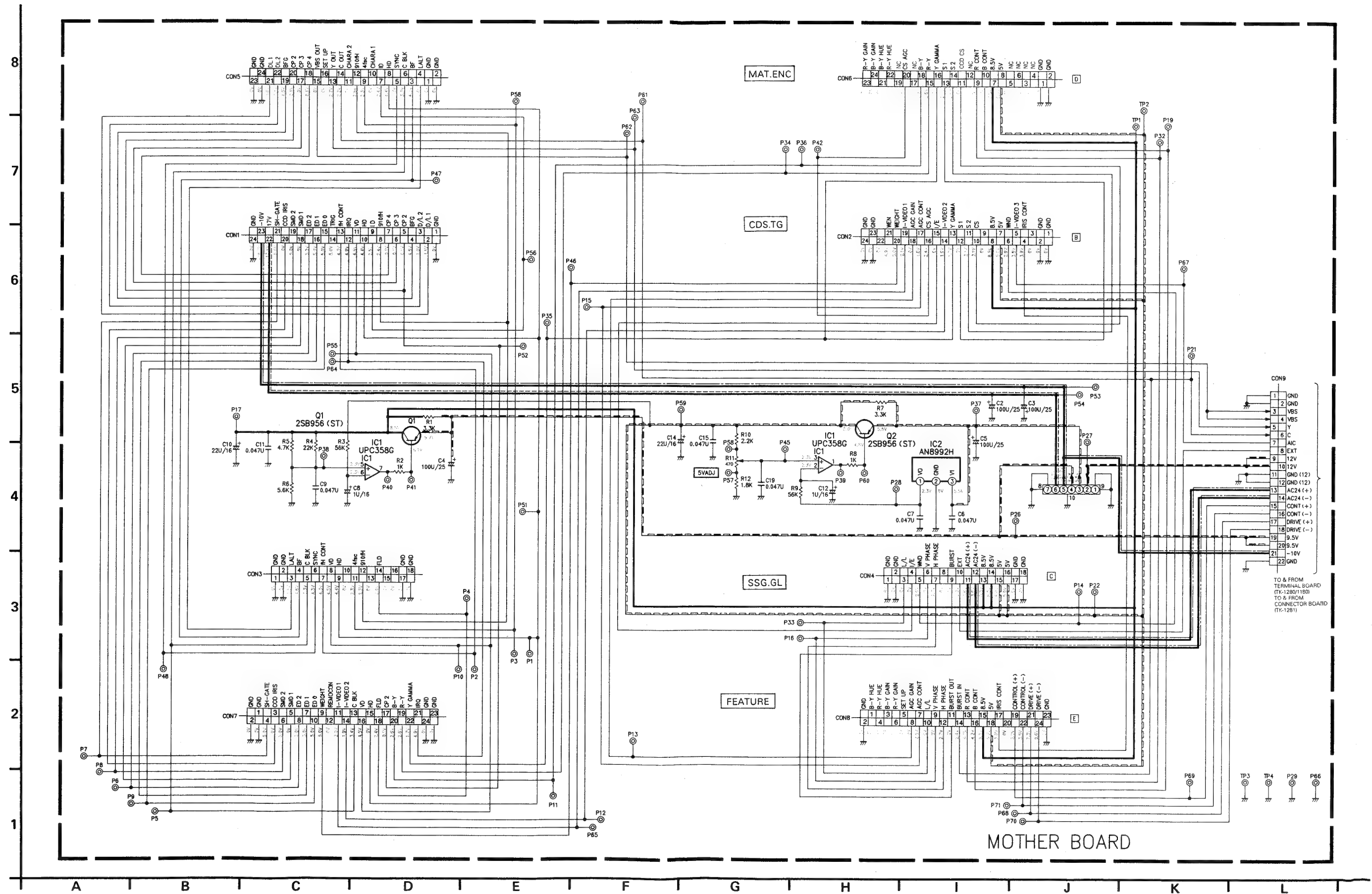
■ TERMINAL BOARD CIRCUIT DIAGRAM **(TK-1280/1180)**



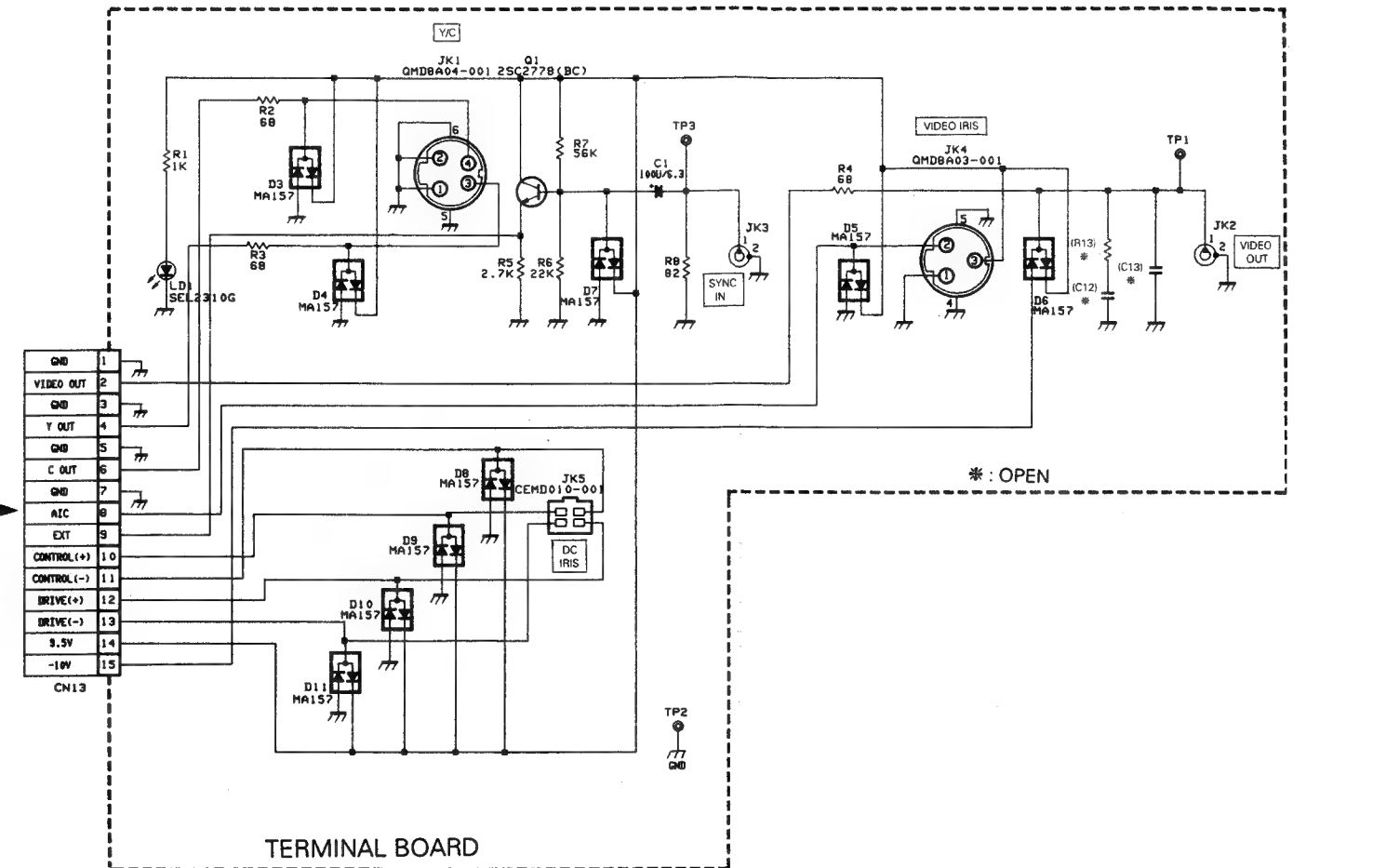
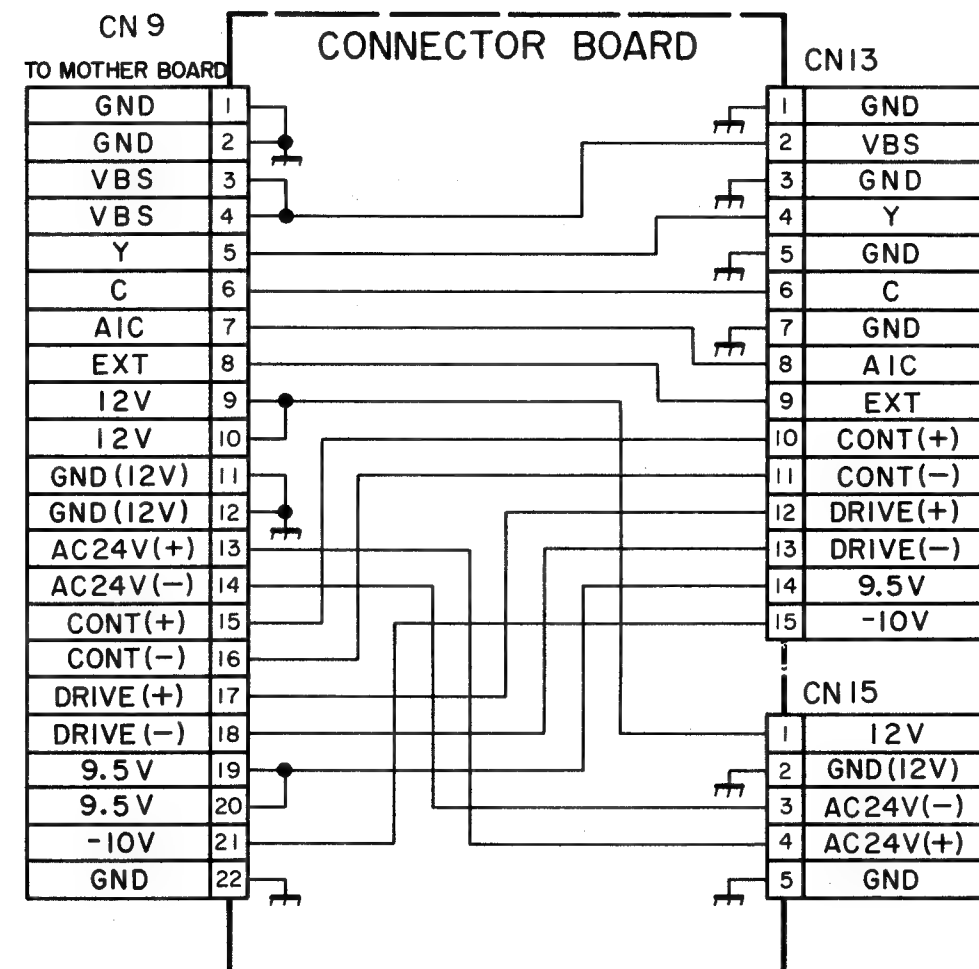
■ TERMINAL CIRCUIT BOARD **(TK-1280/1180)**



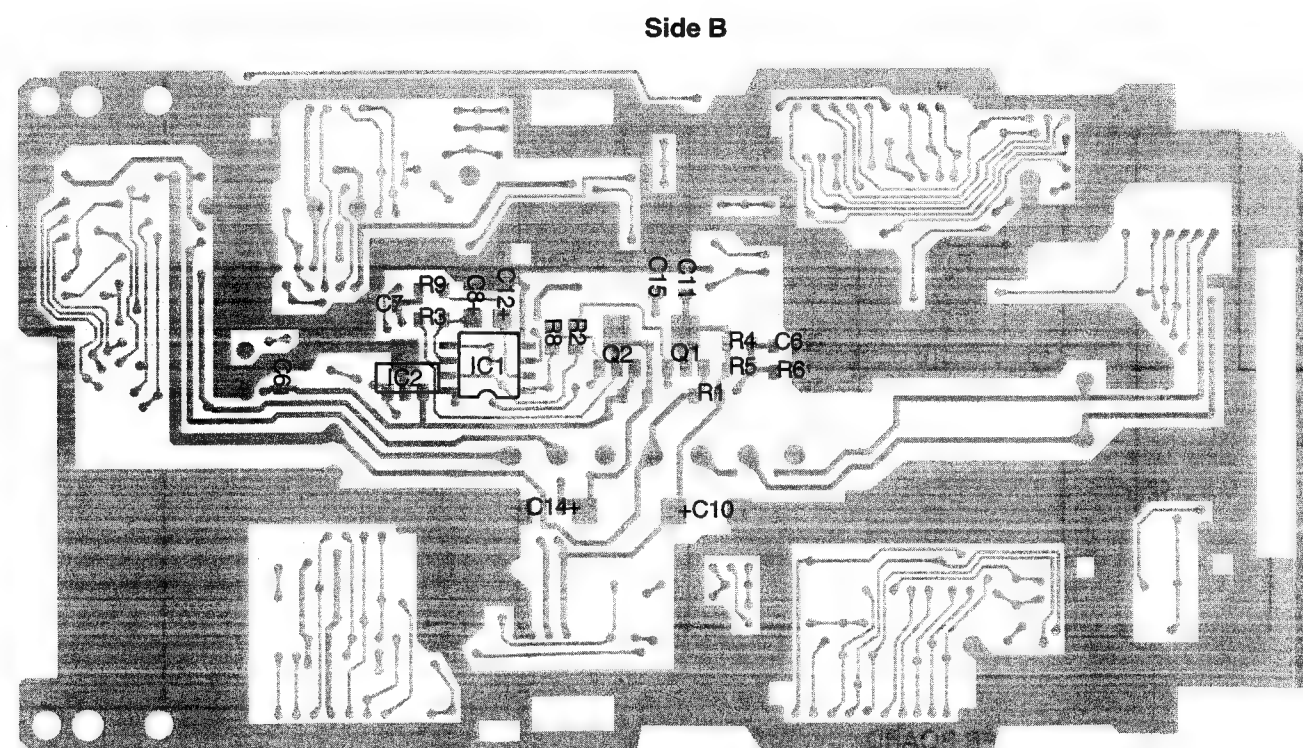
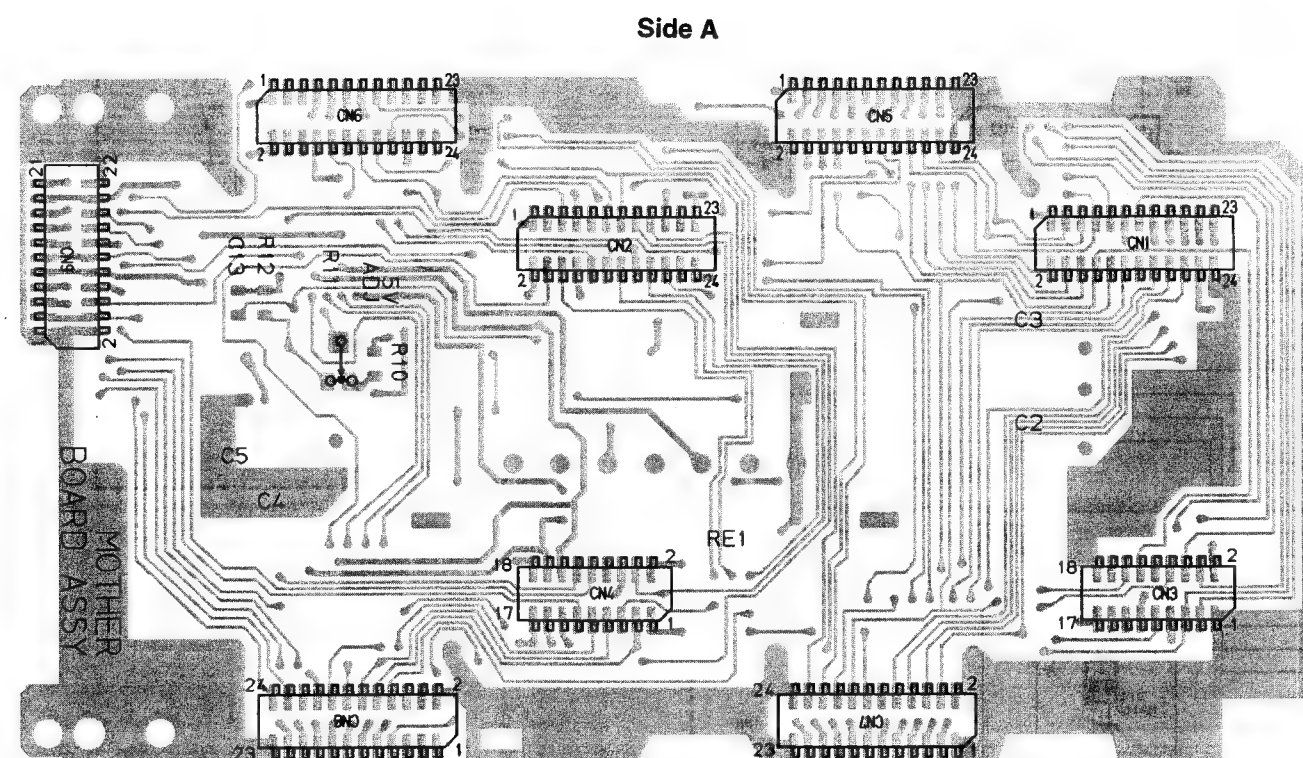
MOTHER BOARD CIRCUIT DIAGRAM



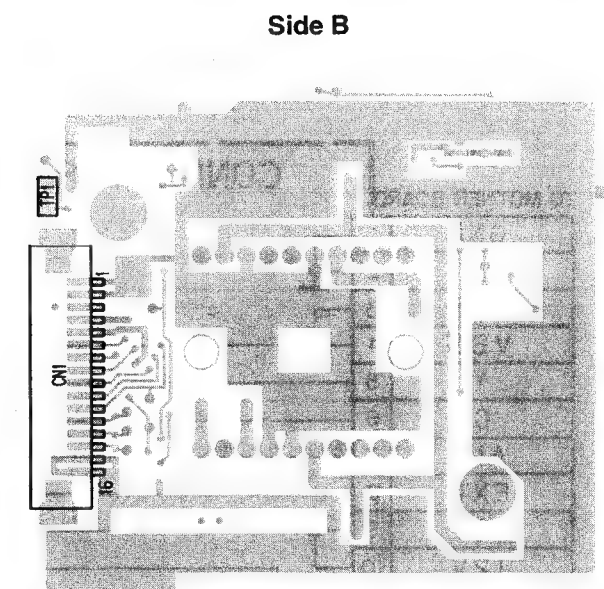
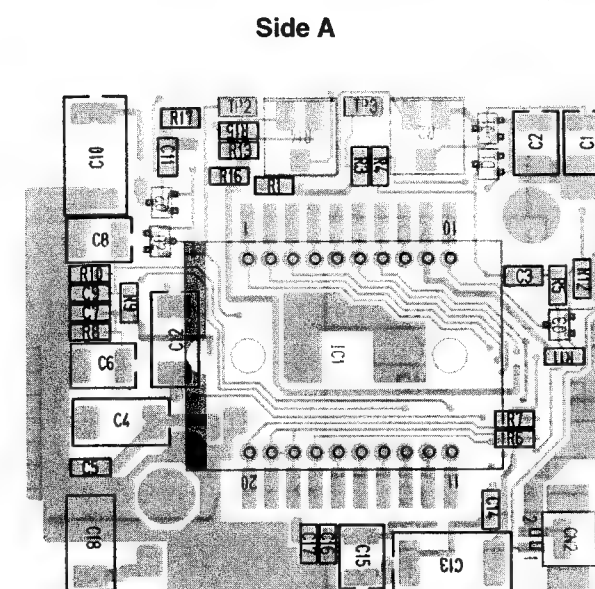
■ CONNECTOR/TERMINAL/POWER BOARD CIRCUIT DIAGRAM (TK-1281EG only)



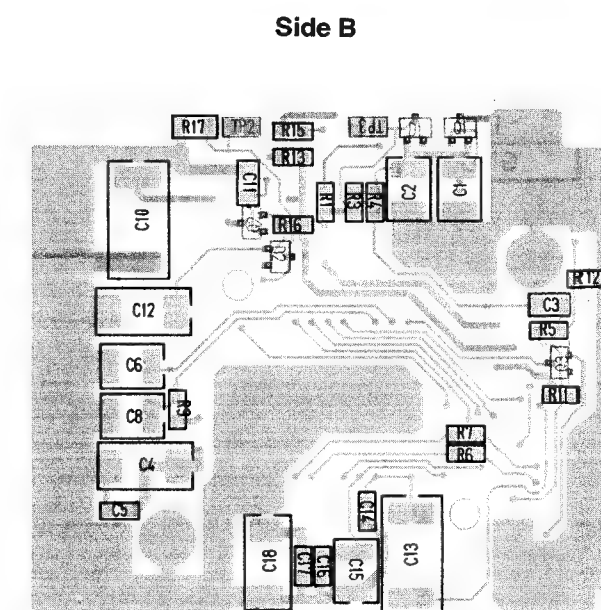
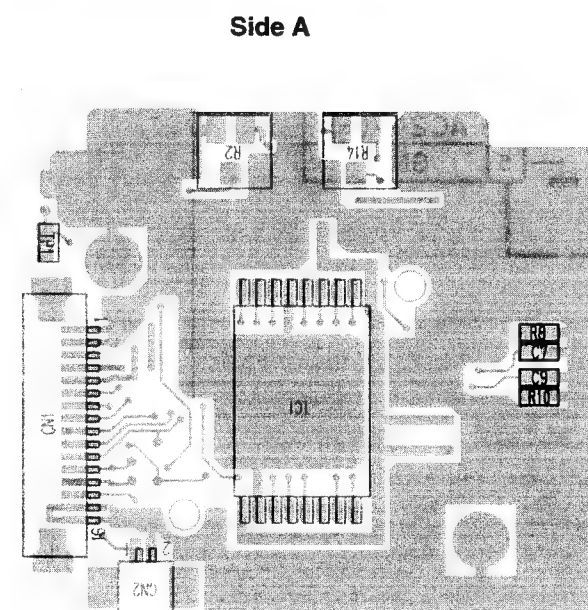
■ MOTHER CIRCUIT BOARD



■ IMAGER CIRCUIT BOARD (TK-1280/1281)

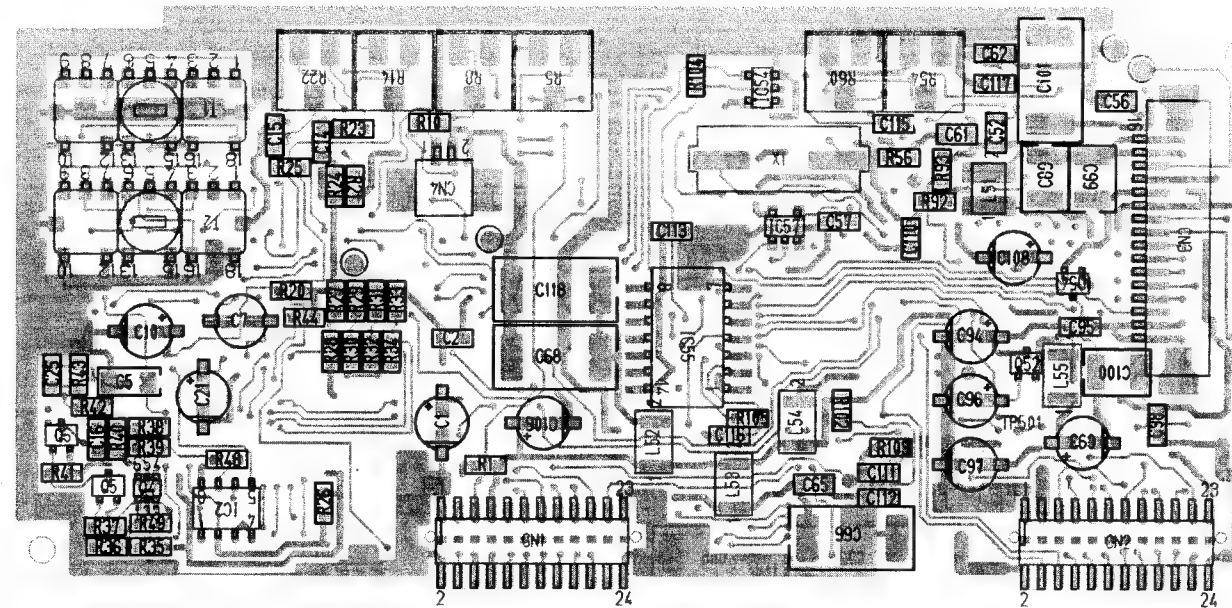


■ IMAGER CIRCUIT BOARD (TK-1180)

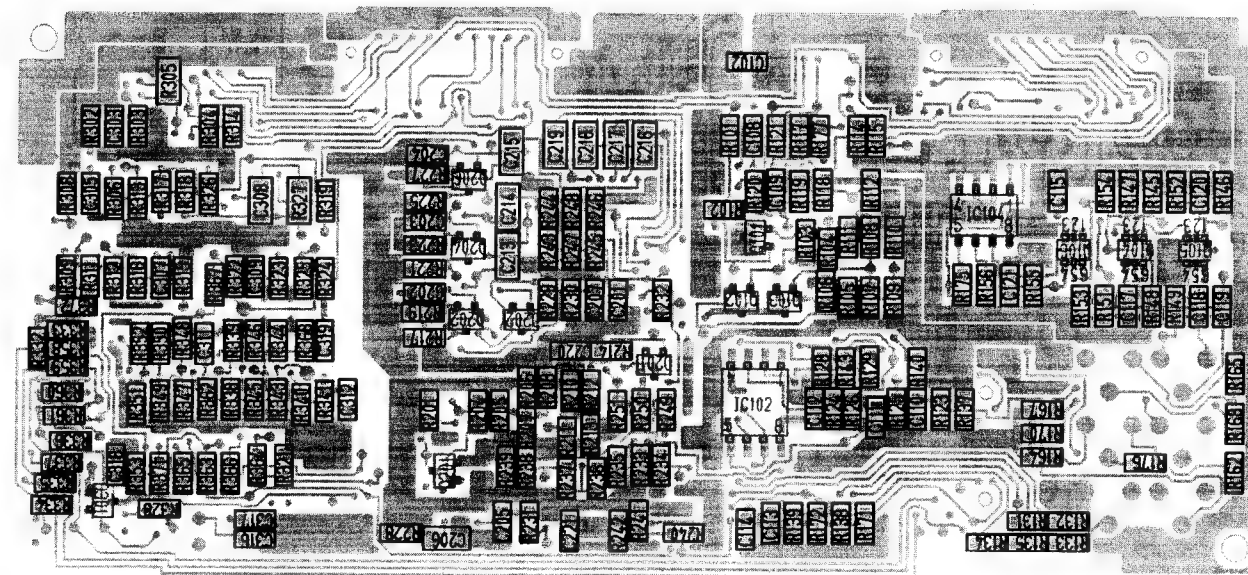


■ CDS/TG CIRCUIT BOARD

Side A

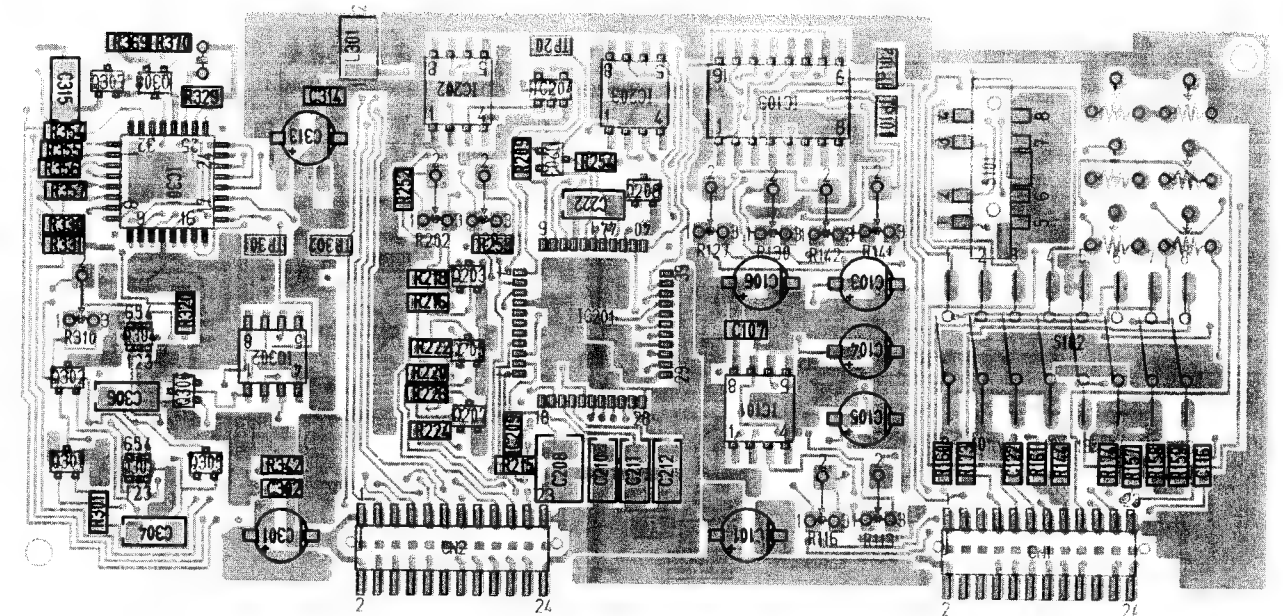


Side B

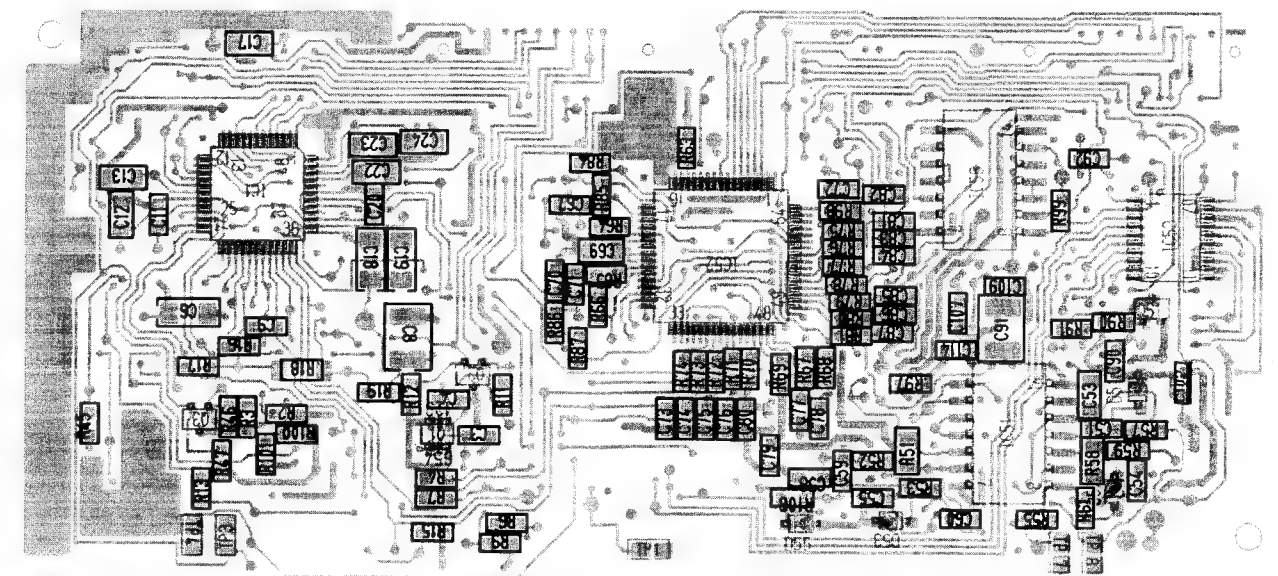


■ SSG/GENLOCK CIRCUIT BOARD

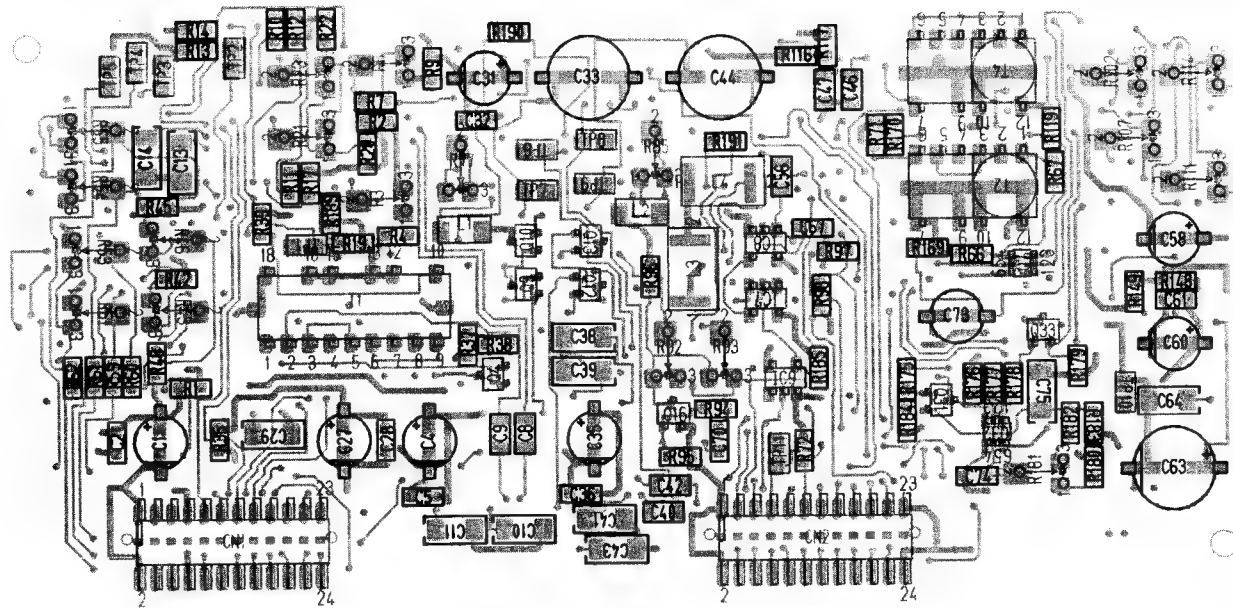
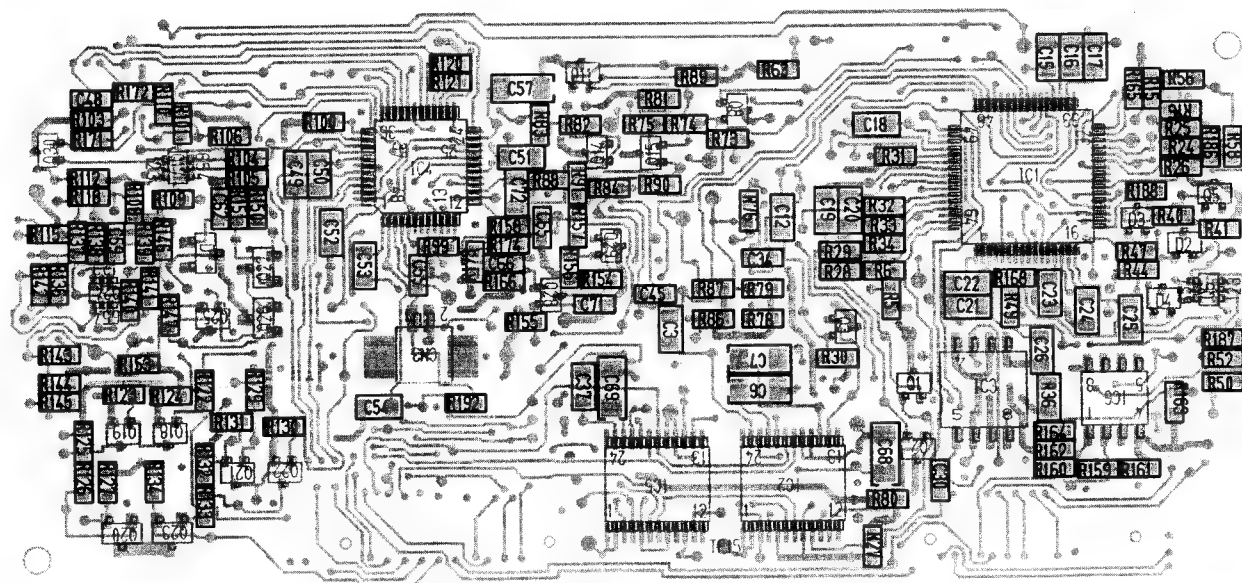
Side A



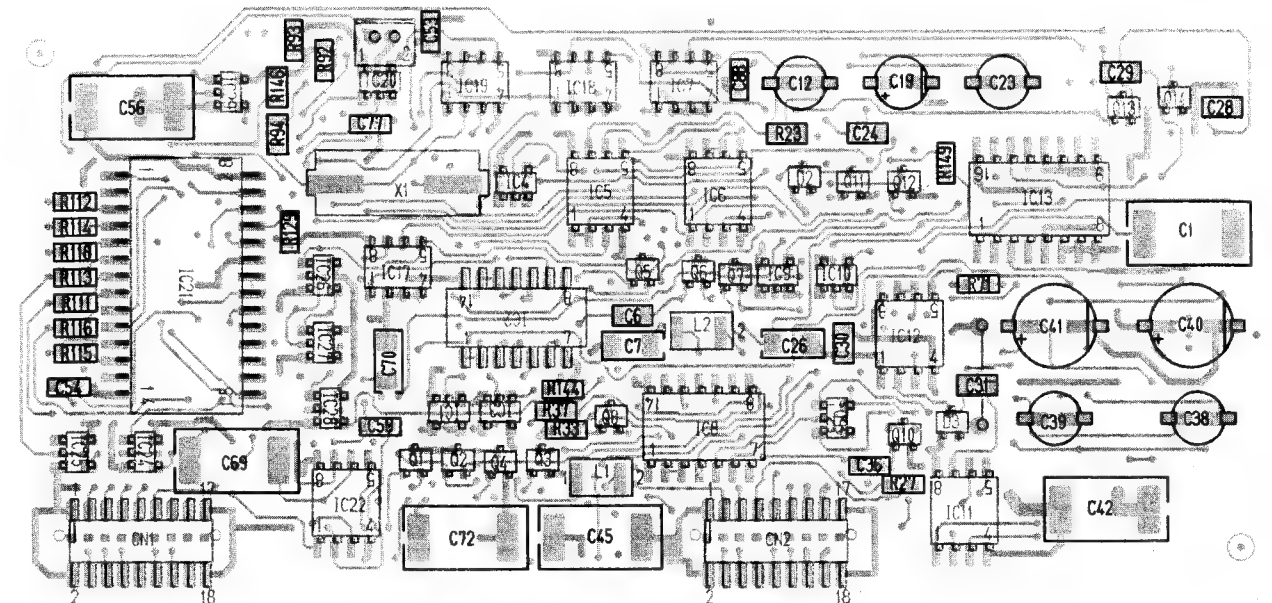
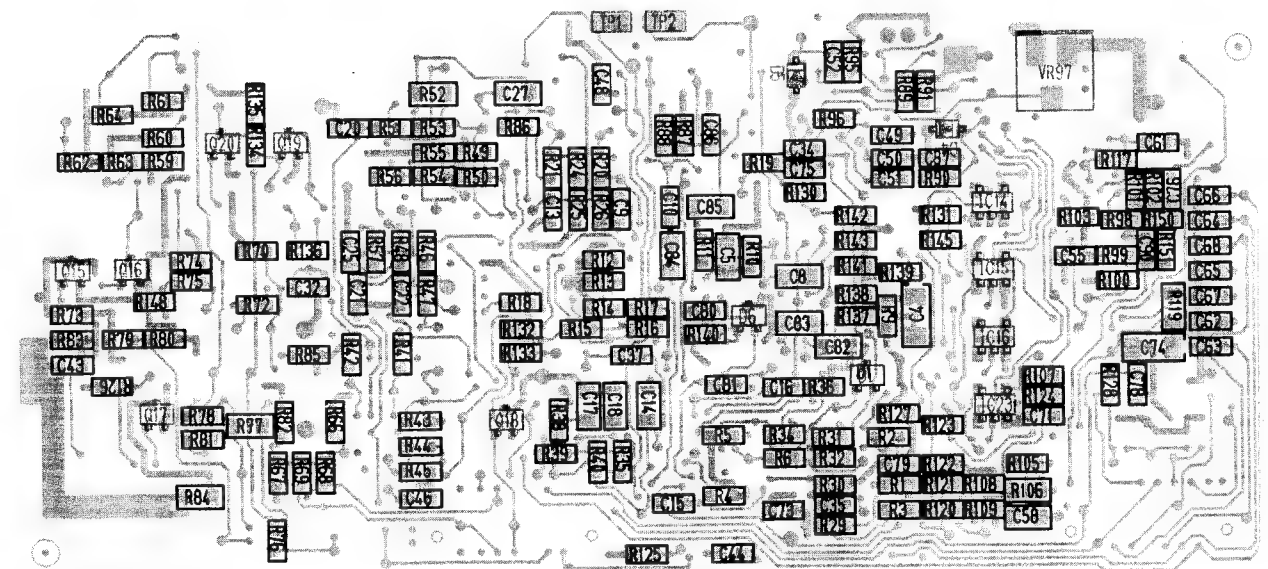
Side B



■ MAT/ENC CIRCUIT BOARD

Side A**Side B**

■ FEATURE CIRCUIT BOARD

Side A**Side B**

Symbol No.	Part No.	Part Name	Description
C1	NEA11CM-106	E.CAPACITOR	10 16V
C2	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C3	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C4	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C5	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C6	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C7	NEE11HM-105	E.CAPACITOR	1.0 50V
C8	NEE21CM-225	TAN.CAPACITOR	2.2 16V
C9	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C10	NEA11CM-106	E.CAPACITOR	10 16V
C11	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C12	NCB21EK-104	CER.CAPACITOR	0.10 25V
C13	NCB21EK-104	CER.CAPACITOR	0.10 25V
C14	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C15	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C16	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C17	NCB21EK-104	CER.CAPACITOR	0.10 25V
C18	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C19	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C20	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C21	NEA11CM-106	E.CAPACITOR	10 16V
C22	NCB21EK-104	CER.CAPACITOR	0.10 25V
C23	NCB21EK-104	CER.CAPACITOR	0.10 25V
C24	NCB21EK-104	CER.CAPACITOR	0.10 25V
C25	NCT06CH-101	CER.CAPACITOR	100P 50V
C51	NCT06CH-220	CER.CAPACITOR	22P 50V
C52	NCT03CH-7R0	CER.CAPACITOR	7.0P 50V
C53	NCT03UJ-150	CER.CAPACITOR	15P 50V
C54	NCB31HK-102	CER.CAPACITOR	1000P 50V
C55	NCB31HK-102	CER.CAPACITOR	1000P 50V
C59	NCT06CH-101	CER.CAPACITOR	100P 50V
C60	NCB31HK-102	CER.CAPACITOR	1000P 50V
C61	NCB21HK-473	CER.CAPACITOR	0.047 50V
C65	NCB21HK-473	CER.CAPACITOR	0.047 50V
C66	NEE11CM-226	TAN.CAPACITOR	22 16V
C67	NCT06CH-470	CER.CAPACITOR	47P 50V
C68	NEE11CM-226	TAN.CAPACITOR	22 16V
C69	NCB21HK-473	CER.CAPACITOR	0.047 50V
C72	NCB31HK-103	CER.CAPACITOR	0.010 50V
C73	NCT06CH-470	CER.CAPACITOR	47P 50V
C74	NCT06CH-470	CER.CAPACITOR	47P 50V
C75	NCT06CH-470	CER.CAPACITOR	47P 50V
C76	NCT06CH-470	CER.CAPACITOR	47P 50V
C77	NCT06CH-470	CER.CAPACITOR	47P 50V
C78	NCT06CH-470	CER.CAPACITOR	47P 50V
C79	NCT06CH-101	CER.CAPACITOR	100P 50V
C80	NCT06CH-101	CER.CAPACITOR	100P 50V
C81	NCT06CH-470	CER.CAPACITOR	47P 50V
C83	NCT06CH-470	CER.CAPACITOR	47P 50V
C84	NCT06CH-470	CER.CAPACITOR	47P 50V
C85	NCT06CH-470	CER.CAPACITOR	47P 50V
C86	NCT06CH-470	CER.CAPACITOR	47P 50V
C87	NCT06CH-470	CER.CAPACITOR	47P 50V
C89	NEE21EM-155	TAN.CAPACITOR	1.5 25V
C90	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C91	NEE21EM-155	TAN.CAPACITOR	1.5 25V
C92	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C93	NEA11HM-335	E.CAPACITOR	3.3 50V
C94	NEA11HM-335	E.CAPACITOR	3.3 50V
C95	NCF31CZ-104	CER.CAPACITOR	0.10 16V

Symbol No.	Part No.	Part Name	Description
C96	NEA11HM-335	E.CAPACITOR	3.3 50V
C97	NEA11HM-335	E.CAPACITOR	3.3 50V
C98	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C100	NEA11HM-335	E.CAPACITOR	3.3 50V
C101	NEE11EM-106	TAN.CAPACITOR	10 25V
C102	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C106	NEA11CM-106	E.CAPACITOR	10 16V
C107	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C108	NEA11CM-106	E.CAPACITOR	10 16V
C109	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C110	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C111	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C112	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C113	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C114	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C115	NCT06CH-101	CER.CAPACITOR	100P 50V
C117	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C118	NEE11CM-226	TAN.CAPACITOR	22 16V
L51	CELP040-3R3	COIL	3.3UH
L52	CELP008-100	COIL	10UH
L53	CELP008-100	COIL	10UH
L54	CELP008-100	COIL	10UH
X1	CE42274-001	CRYSTAL	28.6363MHz
CN1	CHB102W-24R	CONNECTOR	24PIN
CN2	CHB102W-24R	CONNECTOR	24PIN
CN10	CHC105S-16N	CONNECTOR	16PIN
CN11	SCV1770-002	CONNECTOR	2PIN
TP1	SSV1096-001	TEST POINT	
TP3	SSV1096-001	TEST POINT	
TP4	SSV1096-001	TEST POINT	
TP17	SSV1096-001	TEST POINT	
TP18	SSV1096-001	TEST POINT	
T1	CE42162-001	L.P.F.	TK-1280E
T1	CE42207-001	L.P.F.	TK-1180E
T2	CE42163-001	L.P.F.	TK-1280E
T2	CE42208-001	L.P.F.	TK-1180E

● SSG/GL board assembly list 03

SCK2347-02-10B (TK-1280E/1281E)

SCK2347-02-11A (TK-1180E)

03□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	SC14S69F	I.C.(M)	TOSHIBA
IC2	UPD5556G	I.C.(M)	NEC
IC3	SC14S66F	I.C.(M)	TOSHIBA
IC4	SC14S66F	I.C.(M)	TOSHIBA
IC5	UPC842G	I.C.(M)	NEC
IC6	UPC842G	I.C.(M)	NEC
IC7	TC4W53F	I.C.(M)	TOSHIBA
IC8	NJM1496M	I.C.(M)	JRC
IC9	SC14S69F	I.C.(M)	TOSHIBA
IC10	SC14S69F	I.C.(M)	TOSHIBA
IC11	UPC358G	I.C.(M)	NEC
IC12	TA7555F	I.C.(M)	TOSHIBA
IC13	MC14046BF	I.C.(M)	MOTOROLA
IC14	SC14S71F	I.C.(M)	TOSHIBA
IC15	SC14S71F	I.C.(M)	TOSHIBA
IC17	TC4W53F	I.C.(M)	TOSHIBA
IC18	TC4W53F	I.C.(M)	TOSHIBA
IC19	TC7W00F	I.C.(M)	TOSHIBA
IC21	CXD1217M	I.C.(M)	SONY
IC22	UPC842G	I.C.(M)	NEC
IC23	SC14S81F	I.C.(M)	TOSHIBA
IC24	SC14S71F	I.C.(M)	TOSHIBA
IC25	SC14S69F	I.C.(M)	TOSHIBA
IC26	SC14S11F	I.C.(M)	TOSHIBA
IC27	SC14S81F	I.C.(M)	TOSHIBA
IC28	SC14S81F	I.C.(M)	TOSHIBA
Q1	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q2	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q3	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q4	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q5	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q6	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q7	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q8	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q9	FMS2	TRANSISTOR	ROHM
Q10	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q11	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q12	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q13	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q14	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q15	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q16	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q17	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q18	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q19	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q20	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
D1	MA142WK	DIODE	MATSUSHITA
D2	MA142A	DIODE	MATSUSHITA
D3	MA142A	DIODE	MATSUSHITA
D4	HVU306A	VARI-CAPA DIODE	HITACHI
D5	HVU306A	VARI-CAPA DIODE	HITACHI
D6	MA142WK	DIODE	MATSUSHITA
R1	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R2	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R3	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R4	NRSA63J-473	M.G.RESISTOR	47K 1/16W

Symbol No.	Part No.	Part Name	Description
R5	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R6	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R9	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R10	NRSA63J-122	M.G.RESISTOR	1.2K 1/16W
R11	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R12	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R13	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R14	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R15	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R16	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R17	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R18	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R19	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R20	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R21	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R23	NRSA02J-105	M.G.RESISTOR	1.0M 1/10W
R24	NRSA63J-334	M.G.RESISTOR	330K 1/16W
R25	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R26	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R27	NRSA63J-184	M.G.RESISTOR	180K 1/16W
R29	NRSA63J-682	M.G.RESISTOR	6.8K 1/16W
R30	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R31	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R32	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R33	NRSA63J-272	M.G.RESISTOR	2.7K 1/16W
R34	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R35	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R36	NRSA63J-272	M.G.RESISTOR	2.7K 1/16W
R37	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R38	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R39	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R40	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R41	NRSA63J-331	M.G.RESISTOR	330 1/16W
R42	NRSA63J-331	M.G.RESISTOR	330 1/16W
R43	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R44	NRSA63J-473	M.G.RESISTOR	47K 1/16W
R45	NRSA63J-153	M.G.RESISTOR	15K 1/16W
R46	NRSA63J-823	M.G.RESISTOR	82K 1/16W
R47	NRSA63J-473	M.G.RESISTOR	47K 1/16W
R48	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R49	NRSA63J-333	M.G.RESISTOR	33K 1/16W
R50	NRSA63J-683	M.G.RESISTOR	68K 1/16W
R51	NRSA63J-273	M.G.RESISTOR	27K 1/16W
R52	NRSA02J-105	M.G.RESISTOR	1.0M 1/10W
R53	NRSA63J-393	M.G.RESISTOR	39K 1/16W
R54	NRSA63J-274	M.G.RESISTOR	270K 1/16W
R55	NRSA63J-392	M.G.RESISTOR	3.9K 1/16W
R56	NRSA63J-104	M.G.RESISTOR	100K 1/16W
R57	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R59	NRSA63J-822	M.G.RESISTOR	8.2K 1/16W
R60	NRSA63J-123	M.G.RESISTOR	12K 1/16W
R61	NRSA63J-272	M.G.RESISTOR	2.7K 1/16W
R62	NRSA63J-331	M.G.RESISTOR	330 1/16W
R63	NRSA63J-473	M.G.RESISTOR	47K 1/16W
R64	NRSA63J-223	M.G.RESISTOR	22K 1/16W
R66	NRSA63J-563	M.G.RESISTOR	56K 1/16W
R67	NRSA63J-563	M.G.RESISTOR	56K 1/16W
R68	NRSA63J-563	M.G.RESISTOR	56K 1/16W
R69	NRSA63J-563	M.G.RESISTOR	56K 1/16W

Symbol No.	Part No.	Part Name	Description		Symbol No.	Part No.	Part Name	Description	
R70	NRSA63J-103	M.G.RESISTOR	10K	1/16W	R139	NRSA63J-223	M.G.RESISTOR	22K	1/16W
R71	NRSA63J-563	M.G.RESISTOR	56K	1/16W	R140	NRSA63J-683	M.G.RESISTOR	68K	1/16W
R72	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	R141	NRSA63J-104	M.G.RESISTOR	100K	1/16W
R73	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	R142	NRSA63J-333	M.G.RESISTOR	33K	1/16W
R74	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W	R144	NRSA63J-474	M.G.RESISTOR	470K	1/16W
R75	NRSA63J-473	M.G.RESISTOR	47K	1/16W	R148	NRSA63J-153	M.G.RESISTOR	15K	1/16W
R76	NRSA63J-333	M.G.RESISTOR	33K	1/16W	R153	NRSA63J-681	M.G.RESISTOR	680	1/16W TK-1280E
					R153	NRSA63J-221	M.G.RESISTOR	220	1/16W TK-1180E
R77	NRSA02J-105	M.G.RESISTOR	1.0M	1/10W	C1	NEE11CM-106	TAN.CAPACITOR	10	16V
R78	NRSA63J-333	M.G.RESISTOR	33K	1/16W	C4	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R79	NRSA63J-223	M.G.RESISTOR	22K	1/16W	C5	NCB21HK-223	CER.CAPACITOR	0.022	50V
R80	NRSA63J-123	M.G.RESISTOR	12K	1/16W	C6	NCB21HK-473	CER.CAPACITOR	0.047	50V
R81	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W	C7	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R84	NRSA02J-101	M.G.RESISTOR	100	1/10W	C8	NCB21HK-473	CER.CAPACITOR	0.047	50V
R85	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C9	NCB31HK-472	CER.CAPACITOR	4700P	50V
R87	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C10	NCB31HK-472	CER.CAPACITOR	4700P	50V
R88	NRSA63J-153	M.G.RESISTOR	15K	1/16W	C12	NEN11EM-475	E.CAPACITOR	4.7	25V
R90	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C13	NCB31HK-103	CER.CAPACITOR	0.010	50V
R91	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C14	NCB21HK-473	CER.CAPACITOR	0.047	50V
R92	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C15	NCT06CH-560	CER.CAPACITOR	56P	50V
R93	NRSA63J-151	M.G.RESISTOR	150	1/16W	C16	NCB31HK-102	CER.CAPACITOR	1000P	50V
R94	NRSA02J-105	M.G.RESISTOR	1.0M	1/10W	C17	NCB21HK-473	CER.CAPACITOR	0.047	50V
R95	NRSA63J-221	M.G.RESISTOR	220	1/16W	C18	NCB21HK-473	CER.CAPACITOR	0.047	50V
R96	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C19	NEA11CM-106	E.CAPACITOR	10	16V
R97	CEVP006-103	TRIM.RESISTOR	10K	4fsc	C20	NCB31HK-222	CER.CAPACITOR	2200P	50V
R99	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C21	NCT06CH-181	CER.CAPACITOR	180P	50V
R102	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C22	NCT06CH-271	CER.CAPACITOR	270P	50V
R103	NRSA63J-100	M.G.RESISTOR	10	1/16W	C23	NEN11HM-105	E.CAPACITOR	1.0	50V
R105	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	C24	NCT03CH-102	CER.CAPACITOR	1000P	50V
R106	NRSA02J-105	M.G.RESISTOR	1.0M	1/10W	C26	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R107	NRSA63J-223	M.G.RESISTOR	22K	1/16W	C27	NCB21HK-473	CER.CAPACITOR	0.047	50V
R108	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	C28	NCB21HK-273	CER.CAPACITOR	0.027	50V
R109	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	C29	NCB21HK-473	CER.CAPACITOR	0.047	50V
R111	NRSA63J-222	M.G.RESISTOR	2.2K	1/16W	C30	NCB21HK-473	CER.CAPACITOR	0.047	50V
R112	NRSA63J-221	M.G.RESISTOR	220	1/16W	C31	NCB21EK-104	CER.CAPACITOR	0.10	25V
R113	NRSA63J-221	M.G.RESISTOR	220	1/16W	C32	NCB31HK-103	CER.CAPACITOR	0.010	50V
R114	NRSA63J-221	M.G.RESISTOR	220	1/16W	C33	QFV41HJ-105	MYLAR CAPACITOR	1.0	50V
R115	NRSA63J-221	M.G.RESISTOR	220	1/16W	C34	NCB31HK-103	CER.CAPACITOR	0.010	50V
R116	NRSA63J-221	M.G.RESISTOR	220	1/16W	C35	NCT06CH-470	CER.CAPACITOR	47P	50V
R117	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C36	NCT06CH-470	CER.CAPACITOR	47P	50V
R118	NRSA63J-221	M.G.RESISTOR	220	1/16W	C37	NCT06CH-560	CER.CAPACITOR	56P	50V
R119	NRVA02D-5601	M.F.RESISTOR	56	1/10W	C38	NEN11HM-105	E.CAPACITOR	1.0	50V
R120	NRSA63J-333	M.G.RESISTOR	33K	1/16W	C39	NEN11HM-474	E.CAPACITOR	0.47	50V
R121	NRSA63J-333	M.G.RESISTOR	33K	1/16W	C40	NEA11CM-476	E.CAPACITOR	47	16V
R122	NRSA63J-392	M.G.RESISTOR	3.9K	1/16W	C41	NEA11CM-476	E.CAPACITOR	47	16V
R123	NRSA63J-682	M.G.RESISTOR	6.8K	1/16W	C42	NEE11CM-226	TAN.CAPACITOR	22	16V
R124	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C43	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R125	NRSA63J-182	M.G.RESISTOR	1.8K	1/16W	C44	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R126	NRSA63J-123	M.G.RESISTOR	12K	1/16W	C45	NEE11CM-226	TAN.CAPACITOR	22	16V
R127	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C46	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R128	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C48	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R129	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C49	NCT06CH-330	CER.CAPACITOR	33P	50V
R130	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C52	NCB31HK-102	CER.CAPACITOR	1000P	50V
R132	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W	C53	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R133	NRSA63J-101	M.G.RESISTOR	100	1/16W	C54	NCB31HK-103	CER.CAPACITOR	0.010	50V
R134	NRSA63J-274	M.G.RESISTOR	270K	1/16W	C55	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R135	NRSA63J-392	M.G.RESISTOR	3.9K	1/16W	C56	NEE11CM-226	TAN.CAPACITOR	22	16V
R136	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C58	NCB21EK-104	CER.CAPACITOR	0.10	25V
R137	NRSA63J-473	M.G.RESISTOR	47K	1/16W					
R138	NRSA02J-474	M.G.RESISTOR	470K	1/10W					

● MAT/ENC board assembly list 04
 SCK2348-02-40B (TK-1280E/1281E)
 SCK2349-02-61A (TK-1180E)

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Symbol No.	Part No.	Part Name	Description
C59	NCB31HK-103	CER.CAPACITOR	0.010 50V
C60	NCT06CH-470	CER.CAPACITOR	47P 50V
C62	NCT06CH-470	CER.CAPACITOR	47P 50V
C63	NCT06CH-470	CER.CAPACITOR	47P 50V
C64	NCT06CH-470	CER.CAPACITOR	47P 50V
C65	NCT06CH-391	CER.CAPACITOR	390P 50V
C66	NCT06CH-470	CER.CAPACITOR	47P 50V
C67	NCT06CH-470	CER.CAPACITOR	47P 50V
C69	NEE11CM-106	TAN.CAPACITOR	10 16V
C70	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C72	NEE11CM-226	TAN.CAPACITOR	22 16V
C73	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C74	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C76	NCB31HK-103	CER.CAPACITOR	0.010 50V
C79	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C80	NCT06CH-101	CER.CAPACITOR	100P 50V
C81	NCT06CH-101	CER.CAPACITOR	100P 50V
C82	NCT03CH-102	CER.CAPACITOR	1000P 50V
C83	NCB21HK-473	CER.CAPACITOR	0.047 50V
C84	NCB21HK-473	CER.CAPACITOR	0.047 50V
C85	NCT03CH-102	CER.CAPACITOR	1000P 50V
C86	NCB31HK-102	CER.CAPACITOR	1000P 50V
C88	NCF31CZ-104	CER.CAPACITOR	0.10 16V
L1	CELP008-220	COIL	22UH
L2	CELP008-220	COIL	22UH
X1	CE42275-001	CRYSTAL	17.734475MHz
CN3	CHB102W-18R	CONNECTOR	18PIN
CN4	CHB102W-18R	CONNECTOR	18PIN
CN12	SCV1978-S02	CONNECTOR	2PIN
TP1	SSV1096-001	TEST POINT	
TP2	SSV1096-001	TEST POINT	

Symbol No.	Part No.	Part Name	Description
IC1	CXA1391R	I.C.(M)	SONY
IC2	CXL1517N	I.C.(M)	SONY TK-1280E
IC2	CXL1518N	I.C.(M)	SONY TK-1180E
IC3	CXL5504M	I.C.(M)	SONY
IC4	CXA1592R	I.C.(M)	SONY
IC5	CXL1517N	I.C.(M)	SONY TK-1280E
IC5	CXL1518N	I.C.(M)	SONY TK-1180E
IC6	UPC4558G	I.C.(M)	NEC
IC7	SC14S11F	I.C.(M)	TOSHIBA
IC8	TC7S66F	I.C.(M)	TOSHIBA
Q1	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q2	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q3	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q4	2SA1532(ABC)	TRANSISTOR	MATSUSHITA
Q5	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q6	XP4501	TRANSISTOR	MATSUSHITA
Q7	XP4501	TRANSISTOR	MATSUSHITA
Q8	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q9	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q10	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q11	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q12	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q13	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q14	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q15	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q16	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q17	XP4501	TRANSISTOR	MATSUSHITA
Q18	2SC3930(ABC)	TRANSISTOR	MATSUSHITA TK-1280E
Q19	2SA1532(ABC)	TRANSISTOR	MATSUSHITA TK-1280E
Q20	2SD1030(RS)	TRANSISTOR	MATSUSHITA TK-1280E
Q21	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q22	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q23	2SD1030(RS)	TRANSISTOR	MATSUSHITA
Q24	XP6534	TRANSISTOR	MATSUSHITA
Q25	2SC3930(ABC)	TRANSISTOR	MATSUSHITA
Q26	2SD1030(RS)	TRANSISTOR	MATSUSHITA
Q27	2SD601(QR)	TRANSISTOR	MATSUSHITA
Q28	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q29	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q30	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q31	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q32	XP6435	TRANSISTOR	MATSUSHITA
Q33	2SC3930(ABC)	TRANSISTOR	MATSUSHITA
D1	MA3056(L)	ZENER DIODE	MATSUSHITA
D2	MA147	DIODE	MATSUSHITA
D3	MA142K	DIODE	MATSUSHITA
D4	MA147	DIODE	MATSUSHITA
R1	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R2	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R3	CEVP005-332	TRIM.RESISTOR	3.3K Y1.Y2.GAIN
R4	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R6	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R7	NRSA63J-152	M.G.RESISTOR	1.5K 1/16W
R8	CEVP005-472	TRIM.RESISTOR	4.7K C1.GAIN
R9	NRSA63J-822	M.G.RESISTOR	8.2K 1/16W
R10	NRSA63J-124	M.G.RESISTOR	120K 1/16W

Symbol No.	Part No.	Part Name	Description
R11	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R12	NRSA63J-123	M.G.RESISTOR	12K 1/16W
R13	NRSA63J-822	M.G.RESISTOR	8.2K 1/16W
R14	NRSA63J-822	M.G.RESISTOR	8.2K 1/16W
R15	NRSA63J-822	M.G.RESISTOR	8.2K 1/16W
R16	NRSA63J-822	M.G.RESISTOR	8.2K 1/16W
R17	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R20	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R21	CEVP005-103	TRIM.RESISTOR	10K R.GAIN
R22	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R23	CEVP005-103	TRIM.RESISTOR	10K B.GAIN
R24	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R26	NRSA63J-123	M.G.RESISTOR	12K 1/16W
R27	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R28	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R29	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R30	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R31	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R32	NRSA63J-183	M.G.RESISTOR	18K 1/16W
R33	NRSA63J-273	M.G.RESISTOR	27K 1/16W
R34	NRSA63J-153	M.G.RESISTOR	15K 1/16W
R35	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R36	NRSA02J-105	M.G.RESISTOR	1.0M 1/10W
R37	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R38	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R39	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R40	NRSA63J-682	M.G.RESISTOR	6.8K 1/16W
R41	NRSA63J-272	M.G.RESISTOR	2.7K 1/16W
R42	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R43	CEVP005-682	TRIM.RESISTOR	6.8K V.APA CON
R44	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R45	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R46	CEVP005-682	TRIM.RESISTOR	6.8K DL.YH.GAIN
R47	NRSA63J-472	M.G.RESISTOR	4.7K 1/16W
R48	NRSA63J-123	M.G.RESISTOR	12K 1/16W
R49	NRSA63J-123	M.G.RESISTOR	12K 1/16W
R50	NRSA63J-561	M.G.RESISTOR	560 1/16W
R51	CEVP005-103	TRIM.RESISTOR	10K R-Y.GAIN
R52	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R53	CEVP005-103	TRIM.RESISTOR	10K B-Y.GAIN
R54	CEVP005-103	TRIM.RESISTOR	10K B-Y.HUE
R55	CEVP005-103	TRIM.RESISTOR	10K R-Y.HUE
R56	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R58	NRSA63J-153	M.G.RESISTOR	15K 1/16W
R63	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R66	NRSA63J-392	M.G.RESISTOR	3.9K 1/16W
R67	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R71	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R72	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R73	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R74	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R75	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R76	NRSA63J-182	M.G.RESISTOR	1.8K 1/16W
R77	CEVP005-682	TRIM.RESISTOR	6.8K R-Y1.GAIN
R78	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R79	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R80	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R81	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R82	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W

Symbol No.	Part No.	Part Name	Description
R148	NRSA63J-100	M.G.RESISTOR	10 1/16W
R149	NRSA63J-560	M.G.RESISTOR	56 1/16W
R150	NRSA63J-560	M.G.RESISTOR	56 1/16W
R151	NRSA63J-391	M.G.RESISTOR	390 1/16W
R153	NRSA63J-104	M.G.RESISTOR	100K 1/16W
R154	NRSA63J-182	M.G.RESISTOR	1.8K 1/16W
R155	NRSA63J-122	M.G.RESISTOR	1.2K 1/16W
R156	NRSA63J-392	M.G.RESISTOR	3.9K 1/16W
R157	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R158	NRSA63J-152	M.G.RESISTOR	1.5K 1/16W
R159	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R164	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R166	NRSA63J-392	M.G.RESISTOR	3.9K 1/16W
R168	NRSA63J-333	M.G.RESISTOR	33K 1/16W
R169	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R170	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R171	NRSA63J-183	M.G.RESISTOR	18K 1/16W
R172	NRSA63J-182	M.G.RESISTOR	1.8K 1/16W
R173	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R175	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R176	NRSA63J-152	M.G.RESISTOR	1.5K 1/16W
R177	NRSA63J-391	M.G.RESISTOR	390 1/16W
R178	NRSA63J-151	M.G.RESISTOR	150 1/16W
R179	NRSA63J-392	M.G.RESISTOR	3.9K 1/16W
R180	NRSA63J-152	M.G.RESISTOR	1.5K 1/16W
R181	CEVP005-681	TRIM.RESISTOR	680 Y.KNEE
R182	NRSA63J-821	M.G.RESISTOR	820 1/16W
R183	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R185	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R186	NRSA63J-222	M.G.RESISTOR	2.2K 1/16W
R187	NRSA63J-333	M.G.RESISTOR	33K 1/16W
R188	NRSA63J-333	M.G.RESISTOR	33K 1/16W
R190	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R191	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R193	NRSA63J-272	M.G.RESISTOR	2.7K 1/16W TK-1280E
C1	NEA11CM-106	E.CAPACITOR	10 16V
C2	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C3	NCB21EK-104	CER.CAPACITOR	0.10 25V
C4	NEA11CM-106	E.CAPACITOR	10 16V
C5	NCF31CZ-104	CER.CAPACITOR	0.10 16V
C6	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C7	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C8	NCB21EK-104	CER.CAPACITOR	0.10 25V
C9	NCB21EK-104	CER.CAPACITOR	0.10 25V
C10	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C11	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C12	NCB21EK-104	CER.CAPACITOR	0.10 25V
C13	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C14	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C15	NCB21EK-104	CER.CAPACITOR	0.10 25V
C16	NCB21EK-104	CER.CAPACITOR	0.10 25V
C17	NCB21EK-104	CER.CAPACITOR	0.10 25V
C18	NCB21EK-104	CER.CAPACITOR	0.10 25V
C19	NCB21EK-104	CER.CAPACITOR	0.10 25V
C20	NCB21EK-104	CER.CAPACITOR	0.10 25V
C21	NCF21CZ-105	CER.CAPACITOR	1.0 16V
C22	NCF21CZ-105	CER.CAPACITOR	1.0 16V

Symbol No.	Part No.	Part Name	Description		Symbol No.	Part No.	Part Name	Description	
R83	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C23	NCB21EK-104	CER.CAPACITOR	0.10	25V
R84	NRSA63J-182	M.G.RESISTOR	1.8K	1/16W	C24	NCB21EK-104	CER.CAPACITOR	0.10	25V
R85	CEVPO05-682	TRIM.RESISTOR	6.8K	B-Y1.GAIN	C25	NCB21EK-104	CER.CAPACITOR	0.10	25V
R86	NRSA63J-222	M.G.RESISTOR	2.2K	1/16W	C26	NCF21CZ-105	CER.CAPACITOR	1.0	16V
R87	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W	C27	NEA11CM-106	E.CAPACITOR	10	16V
R88	NRSA63J-222	M.G.RESISTOR	2.2K	1/16W	C28	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R89	NRSA63J-222	M.G.RESISTOR	2.2K	1/16W	C29	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R90	NRSA63J-473	M.G.RESISTOR	47K	1/16W	C30	NCB31HK-102	CER.CAPACITOR	1000P	50V
R91	NRSA63J-473	M.G.RESISTOR	47K	1/16W	C31	NEA11CM-106	E.CAPACITOR	10	16V
R92	CEVPO05-223	TRIM.RESISTOR	22K	R-Y.OFFSET	C32	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R93	CEVPO05-223	TRIM.RESISTOR	22K	B-Y.OFFSET	C33	NEN11AM-336	E.CAPACITOR	33	10V
R94	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C34	NCT06CH-390	CER.CAPACITOR	39P	50V
R95	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	C35	NEA11CM-106	E.CAPACITOR	10	16V
R96	NRSA63J-152	M.G.RESISTOR	1.5K	1/16W	C36	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R99	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C37	NCB21EK-104	CER.CAPACITOR	0.10	25V
R100	NRSA63J-223	M.G.RESISTOR	22K	1/16W	C38	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R101	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C39	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R102	CEVPO05-103	TRIM.RESISTOR	10K	BURST	C40	NCB21EK-104	CER.CAPACITOR	0.10	25V
R103	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W	C41	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R104	NRSA63J-682	M.G.RESISTOR	6.8K	1/16W	C42	NCB21EK-104	CER.CAPACITOR	0.10	25V
R105	NRSA63J-682	M.G.RESISTOR	6.8K	1/16W	C43	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R106	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W	C44	NEN11AM-336	E.CAPACITOR	33	10V
R107	CEVPO05-682	TRIM.RESISTOR	6.8K	APL	C45	NCT06CH-390	CER.CAPACITOR	39P	50V
R108	NRSA63J-682	M.G.RESISTOR	6.8K	1/16W	C46	NCB21EK-104	CER.CAPACITOR	0.10	25V
R109	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W	C47	NCB21EK-104	CER.CAPACITOR	0.10	25V
R110	NRSA63J-392	M.G.RESISTOR	3.9K	1/16W	C48	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R111	CEVPO05-103	TRIM.RESISTOR	10K	Y.GAIN	C49	NCF21CZ-105	CER.CAPACITOR	1.0	16V
R112	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C50	NCB21EK-104	CER.CAPACITOR	0.10	25V
R114	CEVPO05-103	TRIM.RESISTOR	10K	Y.SETUP	C51	NCB21EK-104	CER.CAPACITOR	0.10	25V
R115	NRSA63J-222	M.G.RESISTOR	2.2K	1/16W	C52	NCB21EK-104	CER.CAPACITOR	0.10	25V
R117	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C53	NCB21EK-104	CER.CAPACITOR	0.10	25V
R119	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C54	NCB21EK-104	CER.CAPACITOR	0.10	25V
R120	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C55	NCB31HK-102	CER.CAPACITOR	1000P	50V
R121	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C56	NCB21EK-104	CER.CAPACITOR	0.10	25V
R122	NRSA63J-101	M.G.RESISTOR	100	1/16W TK-1280E	C57	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R123	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W TK-1280E	C58	NEA10GM-476	E.CAPACITOR	47	4V
R124	NRSA63J-122	M.G.RESISTOR	1.2K	1/16W TK-1280E	C59	NCT06CH-9R0	CER.CAPACITOR	9.0P	50V
R125	NRSA63J-122	M.G.RESISTOR	1.2K	1/16W TK-1280E	C60	NEA11CM-106	E.CAPACITOR	10	16V
R126	NRSA63J-101	M.G.RESISTOR	100	1/16W TK-1280E	C61	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R127	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W TK-1280E	C62	NCB31HK-102	CER.CAPACITOR	1000P	50V
R129	NRSA63J-101	M.G.RESISTOR	100	1/16W	C63	NEA10JM-107	E.CAPACITOR	100	6.3V
R130	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W	C64	NEE21CM-684	TAN.CAPACITOR	0.68	16V
R131	NRSA63J-122	M.G.RESISTOR	1.2K	1/16W	C65	NCT06CH-151	CER.CAPACITOR	150P	50V
R132	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W TK-1280E	C66	NCT06CH-180	CER.CAPACITOR	18P	50V
R132	NRSA63J-122	M.G.RESISTOR	1.2K	1/16W TK-1180E	C67	NCB31HK-103	CER.CAPACITOR	0.010	50V
R133	NRSA63J-101	M.G.RESISTOR	100	1/16W	C68	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R134	NRSA63J-392	M.G.RESISTOR	3.9K	1/16W	C69	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R136	NRSA63J-223	M.G.RESISTOR	22K	1/16W	C70	NCT06CH-101	CER.CAPACITOR	100P	50V
R137	NRSA63J-123	M.G.RESISTOR	12K	1/16W	C71	NCT06CH-180	CER.CAPACITOR	18P	50V
R138	NRSA63J-101	M.G.RESISTOR	100	1/16W	C72	NCB21EK-104	CER.CAPACITOR	0.10	25V
R139	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C73	NEN11HM-105	E.CAPACITOR	1.0	50V
R140	NRSA63J-471	M.G.RESISTOR	470	1/16W	C74	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R141	NRSA63J-681	M.G.RESISTOR	680	1/16W	C75	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R142	NRSA63J-222	M.G.RESISTOR	2.2K	1/16W	C76	NCT06CH-271	CER.CAPACITOR	270P	50V TK-1180E
R143	NRSA63J-123	M.G.RESISTOR	12K	1/16W	C77	NCT06CH-271	CER.CAPACITOR	270P	50V TK-1180E
R144	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	C78	NCT06CH-390	CER.CAPACITOR	39P	50V TK-1180E
R145	NRSA63J-223	M.G.RESISTOR	22K	1/16W	L1	CE41131-330	INDUCTOR	33UH	
R146	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	L2	CE41131-330	INDUCTOR	33UH	
R147	NRSA63J-101	M.G.RESISTOR	100	1/16W	L3	CE40344-8R2	INDUCTOR	8.2UH	

● FEATURE board assembly list 05

SCK2347-03-40B (TK-1280E/1281E)

SCK2347-03-61A (TK-1180E)

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Symbol No.	Part No.	Part Name	Description
L4	CE40344-680	INDUCTOR	68UH
CN5	CHB102W-24R	CONNECTOR	24PIN
CN6	CHB102W-24R	CONNECTOR	24PIN
CN12	SCV1770-002	CONNECTOR	2PIN
TP1	SSV1096-001	TEST POINT	
TP2	SSV1096-001	TEST POINT	
TP3	SSV1096-001	TEST POINT	
TP6	SSV1096-001	TEST POINT	
TP7	SSV1096-001	TEST POINT	
TP8	SSV1096-001	TEST POINT	
TP9	SSV1096-001	TEST POINT	
TP11	SSV1096-001	TEST POINT	
T1	CE42206-001	L.P.F.	
T2	CE41920-00A	L.P.F.	
T4	CE41919-00A	L.P.F.	TK-1280E
T4	CE42017-00A	L.P.F.	TK-1180E

Symbol No.	Part No.	Part Name	Description
IC101	UPC358G	I.C.(M)	NEC
IC102	UPC358G	I.C.(M)	NEC
IC103	TC4052BF	I.C.(M)	TOSHIBA
IC104	TC4W53F	I.C.(M)	TOSHIBA
IC201	HA118118MA	I.C.(M)	HITACHI
IC202	TA7555F	I.C.(M)	TOSHIBA
IC203	UPC358G	I.C.(M)	NEC
IC204	SC14S81F	I.C.(M)	TOSHIBA
IC301	SC405628FB	I.C.(M)	MOTOROLA
IC302	UPC4558G	I.C.(M)	NEC
Q101	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q102	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q103	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q104	XP4501	TRANSISTOR	MATSUSHITA
Q105	XP6401	TRANSISTOR	MATSUSHITA
Q106	XP4501	TRANSISTOR	MATSUSHITA
Q201	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q202	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q203	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q204	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q205	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q206	2SC3936(BC)	TRANSISTOR	MATSUSHITA
Q207	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q208	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q301	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q302	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q303	XP4601	TRANSISTOR	MATSUSHITA
Q304	XP4601	TRANSISTOR	MATSUSHITA
Q305	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q306	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
Q307	2SB1218A(QR)	TRANSISTOR	MATSUSHITA
Q308	2SD1819A(QR)	TRANSISTOR	MATSUSHITA
D202	MA142K	DIODE	MATSUSHITA
D203	MA142K	DIODE	MATSUSHITA
D301	MA142K	DIODE	MATSUSHITA
R101	NRSA63J-101	M.G.RESISTOR	100 1/16W
R102	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R103	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R104	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R105	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R107	NRSA63J-102	M.G.RESISTOR	1.0K 1/16W
R108	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R109	NRSA63J-0R0	M.G.RESISTOR	0 1/16W
R110	NRSA63J-224	M.G.RESISTOR	220K 1/16W
R111	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R112	NRSA63J-562	M.G.RESISTOR	5.6K 1/16W
R113	CEVP005-102	TRIM.RESISTOR	1K GAIN
R114	NRSA63J-332	M.G.RESISTOR	3.3K 1/16W
R115	NRSA63J-223	M.G.RESISTOR	22K 1/16W
R116	CEVP005-473	TRIM.RESISTOR	47K AGC
R117	NRSA63J-331	M.G.RESISTOR	330 1/16W
R118	NRSA63J-272	M.G.RESISTOR	2.7K 1/16W
R119	NRSA63J-392	M.G.RESISTOR	3.9K 1/16W
R120	NRSA63J-103	M.G.RESISTOR	10K 1/16W
R121	NRSA63J-103	M.G.RESISTOR	10K 1/16W

Symbol No.	Part No.	Part Name	Description		Symbol No.	Part No.	Part Name	Description	
R122	QVPC406-103	TRIM.RESISTOR	10K	R-B	R206	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R123	NRSA63J-393	M.G.RESISTOR	39K	1/16W	R207	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R124	NRSA63J-183	M.G.RESISTOR	18K	1/16W	R208	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R125	NRSA63J-153	M.G.RESISTOR	15K	1/16W	R209	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R126	NRSA63J-223	M.G.RESISTOR	22K	1/16W	R210	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R127	CEVPO05-332	TRIM.RESISTOR	3.3K	R.OFFSET	R211	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R128	NRSA63J-183	M.G.RESISTOR	18K	1/16W	R212	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R129	NRSA63J-153	M.G.RESISTOR	15K	1/16W	R213	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R130	CEVPO05-223	TRIM.RESISTOR	22K	R.GAIN	R214	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R131	NRSA63J-103	M.G.RESISTOR	10K	1/16W	R215	NRSA63J-334	M.G.RESISTOR	330K	1/16W
R132	NRSA63J-154	M.G.RESISTOR	150K	1/16W	R216	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W
R133	NRSA63J-273	M.G.RESISTOR	27K	1/16W	R217	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W
R134	NRSA63J-103	M.G.RESISTOR	10K	1/16W	R218	NRSA63J-152	M.G.RESISTOR	1.5K	1/16W
R135	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R219	NRSA63J-182	M.G.RESISTOR	1.8K	1/16W
R136	QVPC406-103	TRIM.RESISTOR	10K	G-Mg	R220	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W
R137	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W	R221	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W
R138	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R222	NRSA63J-182	M.G.RESISTOR	1.8K	1/16W
R139	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R223	NRSA63J-182	M.G.RESISTOR	1.8K	1/16W
R140	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	R224	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W
R141	CEVPO05-472	TRIM.RESISTOR	4.7K	R.CTL	R225	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W
R142	CEVPO05-472	TRIM.RESISTOR	4.7K	B.CTL	R226	NRSA63J-152	M.G.RESISTOR	1.5K	1/16W
R143	NRSA63J-822	M.G.RESISTOR	8.2K	1/16W	R227	NRSA63J-821	M.G.RESISTOR	820	1/16W
R144	NRSA63J-100	M.G.RESISTOR	10	1/16W	R228	NRSA63J-154	M.G.RESISTOR	150K	1/16W
R145	NRSA63J-473	M.G.RESISTOR	47K	1/16W	R229	NRSA63J-0R0	M.G.RESISTOR	0	1/16W
R146	NRSA63J-153	M.G.RESISTOR	15K	1/16W	R230	NRSA63J-104	M.G.RESISTOR	100K	1/16W
R147	NRSA63J-821	M.G.RESISTOR	820	1/16W	R232	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R148	NRSA63J-471	M.G.RESISTOR	470	1/16W	R233	NRSA63J-223	M.G.RESISTOR	22K	1/16W
R149	NRSA63J-681	M.G.RESISTOR	680	1/16W	R234	NRSA63J-223	M.G.RESISTOR	22K	1/16W
R150	QVPC406-102	TRIM.RESISTOR	1K	SC	R235	NRSA63J-563	M.G.RESISTOR	56K	1/16W
R151	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	R236	NRSA63J-683	M.G.RESISTOR	68K	1/16W
R152	NRSA63J-151	M.G.RESISTOR	150	1/16W	R237	NRSA63J-333	M.G.RESISTOR	33K	1/16W
R153	NRSA63J-221	M.G.RESISTOR	220	1/16W	R238	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R154	NRSA63J-331	M.G.RESISTOR	330	1/16W	R239	NRSA63J-563	M.G.RESISTOR	56K	1/16W
R155	NRSA63J-391	M.G.RESISTOR	390	1/16W	R240	NRSA63J-393	M.G.RESISTOR	39K	1/16W
R156	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	R241	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R157	NRSA63J-103	M.G.RESISTOR	10K	1/16W	R242	NRSA63J-563	M.G.RESISTOR	56K	1/16W
R158	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R243	NRSA63J-333	M.G.RESISTOR	33K	1/16W
R159	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R244	NRSA63J-153	M.G.RESISTOR	15K	1/16W
R160	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	R245	NRSA63J-123	M.G.RESISTOR	12K	1/16W
R161	NRSA63J-473	M.G.RESISTOR	47K	1/16W	R246	NRSA63J-333	M.G.RESISTOR	33K	1/16W
R162	NRSA63J-471	M.G.RESISTOR	470	1/16W	R247	NRSA63J-333	M.G.RESISTOR	33K	1/16W
R163	QVPC406-502	TRIM.RESISTOR	5K	V.P.	R248	NRSA63J-123	M.G.RESISTOR	12K	1/16W
R165	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	R249	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R166	QVPC406-103	TRIM.RESISTOR	10K	H	R250	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W
R167	NRSA63J-272	M.G.RESISTOR	2.7K	1/16W	R251	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R168	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	R252	NRSA63J-473	M.G.RESISTOR	47K	1/16W
R169	QVPC406-103	TRIM.RESISTOR	10K	IRIS.LEVEL	R253	NRSA63J-473	M.G.RESISTOR	47K	1/16W
R170	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	R254	NRSA63J-104	M.G.RESISTOR	100K	1/16W
R171	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R301	NRSA63J-101	M.G.RESISTOR	100	1/16W
R172	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R302	NRSA63J-152	M.G.RESISTOR	1.5K	1/16W
R173	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	R303	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W
R174	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	R304	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R175	NRSA63J-104	M.G.RESISTOR	100K	1/16W	R306	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W
R176	NRSA63J-333	M.G.RESISTOR	33K	1/16W	R308	NRSA63J-103	M.G.RESISTOR	10K	1/16W
R177	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	R309	NRSA63J-122	M.G.RESISTOR	1.2K	1/16W
R201	NRSA63J-152	M.G.RESISTOR	1.5K	1/16W	R310	CEVPO05-222	TRIM.RESISTOR	2.2K	CCD.IRIS
R202	CEVPO05-223	TRIM.RESISTOR	22K	AWB.B	R311	NRSA63J-122	M.G.RESISTOR	1.2K	1/16W
R203	CEVPO05-223	TRIM.RESISTOR	22K	AWB.R	R312	NRSA63J-392	M.G.RESISTOR	3.9K	1/16W
R204	NRSA63J-103	M.G.RESISTOR	10K	1/16W	R313	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W
R205	NRSA63J-472	M.G.RESISTOR	4.7K	1/16W	R314	NRSA63J-223	M.G.RESISTOR	22K	1/16W

Symbol No.	Part No.	Part Name	Description		Symbol No.	Part No.	Part Name	Description	
R315	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C112	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R316	NRSA63J-101	M.G.RESISTOR	100	1/16W	C113	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R317	NRSA63J-562	M.G.RESISTOR	5.6K	1/16W	C114	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R318	NRSA63J-153	M.G.RESISTOR	15K	1/16W	C115	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R319	NRSA63J-153	M.G.RESISTOR	15K	1/16W	C116	NCB31HK-103	CER.CAPACITOR	0.010	50V
R320	NRSA63J-334	M.G.RESISTOR	330K	1/16W	C117	NCT06CH-470	CER.CAPACITOR	47P	50V
R321	NRSA63J-334	M.G.RESISTOR	330K	1/16W	C118	NCT06CH-680	CER.CAPACITOR	68P	50V
R322	NRSA63J-273	M.G.RESISTOR	27K	1/16W	C119	NCB31HK-103	CER.CAPACITOR	0.010	50V
R323	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C120	NCT06CH-560	CER.CAPACITOR	56P	50V
R324	NRSA63J-473	M.G.RESISTOR	47K	1/16W					
R325	NRSA63J-473	M.G.RESISTOR	47K	1/16W	C121	NCT06CH-100	CER.CAPACITOR	10P	50V
R326	NRSA63J-223	M.G.RESISTOR	22K	1/16W	C122	NCB31HK-103	CER.CAPACITOR	0.010	50V
R328	NRSA63J-274	M.G.RESISTOR	270K	1/16W	C201	NCT06CH-101	CER.CAPACITOR	100P	50V
R329	NRSA02J-105	M.G.RESISTOR	1.0M	1/10W	C202	NCT06CH-560	CER.CAPACITOR	56P	50V
R330	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C203	NCT06CH-560	CER.CAPACITOR	56P	50V
R331	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C204	NCT06CH-560	CER.CAPACITOR	56P	50V
R332	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C205	NCB31HK-103	CER.CAPACITOR	0.010	50V
R333	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C206	NCB21EK-104	CER.CAPACITOR	0.10	25V
R338	NRSA63J-332	M.G.RESISTOR	3.3K	1/16W	C207	NCT06CH-390	CER.CAPACITOR	39P	50V
R339	NRSA63J-183	M.G.RESISTOR	18K	1/16W	C208	NEE21AM-475	TAN.CAPACITOR	4.7	10V
R340	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C209	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R342	NRSA63J-0R0	M.G.RESISTOR	0	1/16W	C210	NEE21AM-225	TAN.CAPACITOR	2.2	10V
R344	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C211	NEE21AM-225	TAN.CAPACITOR	2.2	10V
R345	NRSA63J-104	M.G.RESISTOR	100K	1/16W TK-1180E	C212	NEE21AM-225	TAN.CAPACITOR	2.2	10V
R346	NRSA63J-104	M.G.RESISTOR	100K	1/16W TK-1280E	C213	NCB21HK-473	CER.CAPACITOR	0.047	50V
R348	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C214	NCB21HK-473	CER.CAPACITOR	0.047	50V
R350	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C215	NCB21HK-473	CER.CAPACITOR	0.047	50V
R352	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C216	NCB21HK-473	CER.CAPACITOR	0.047	50V
R353	NRSA63J-104	M.G.RESISTOR	100K	1/16W	C217	NCB21HK-473	CER.CAPACITOR	0.047	50V
R354	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C218	NCB21HK-473	CER.CAPACITOR	0.047	50V
R355	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C219	NCB21HK-473	CER.CAPACITOR	0.047	50V
R356	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C220	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R357	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C221	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R358	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C222	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R359	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C301	NEA10JM-226	E.CAPACITOR	22	6.3V
R360	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C302	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R361	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C303	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R362	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C304	NEE21VM-104	TAN.CAPACITOR	0.10	35V
R363	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C305	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R364	NRSA63J-103	M.G.RESISTOR	10K	1/16W	C306	NEE21CM-105	TAN.CAPACITOR	1.0	16V
R365	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C307	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R366	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C308	NCB21EK-104	CER.CAPACITOR	0.10	25V
R367	NRSA63J-102	M.G.RESISTOR	1.0K	1/16W	C309	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R369	NRSA63J-183	M.G.RESISTOR	18K	1/16W	C311	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R370	NRSA63J-473	M.G.RESISTOR	47K	1/16W	C312	NCF31CZ-104	CER.CAPACITOR	0.10	16V
R371	NRSA63J-183	M.G.RESISTOR	18K	1/16W	C313	NEA10JM-226	E.CAPACITOR	22	6.3V
R372	NRSA63J-471	M.G.RESISTOR	470	1/16W	C314	NCF31CZ-104	CER.CAPACITOR	0.10	16V
C101	NEA10JM-226	E.CAPACITOR	22	6.3V	C315	NEE21VM-474	TAN.CAPACITOR	0.47	35V
C102	NCF31CZ-104	CER.CAPACITOR	0.10	16V	C316	NCT06CH-150	CER.CAPACITOR	15P	50V
C103	NEA10JM-226	E.CAPACITOR	22	6.3V	C317	NCT06CH-150	CER.CAPACITOR	15P	50V
C104	NEA11CM-106	E.CAPACITOR	10	16V					
C105	NEA11CM-106	E.CAPACITOR	10	16V	L301	CELP008-101	COIL	100UH	
C106	NEA11CM-106	E.CAPACITOR	10	16V					
C107	NCF31CZ-104	CER.CAPACITOR	0.10	16V	X301	CE41216-001	CRYSTAL	4MHz	
C108	NCF31CZ-104	CER.CAPACITOR	0.10	16V					
C109	NCF31CZ-104	CER.CAPACITOR	0.10	16V	S101	NSS1A23-C01	SELECT SWITCH	WHITE.BALANCE	
C110	NCF31CZ-104	CER.CAPACITOR	0.10	16V	S102	CESD004-004	DIP SWITCH	SHUTTER.MODE	
C111	NCF31CZ-104	CER.CAPACITOR	0.10	16V					

● TERMINAL board assembly list 06

SCK2336-02-40A (TK-1280E)

SCK2336-02-61A (TK-1180E)

06□□□□□□

Symbol No.	Part No.	Part Name	Description
CN7	CHB102W-24R	CONNECTOR	24PIN
CN8	CHB102W-24R	CONNECTOR	24PIN
TP101	SSV1096-001	TEST POINT	
TP102	SSV1096-001	TEST POINT	
TP201	SSV1096-001	TEST POINT	
TP301	SSV1096-001	TEST POINT	
TP302	SSV1096-001	TEST POINT	

Symbol No.	Part No.	Part Name	Description
Q1	2SC2778(C)	TRANSISTOR	MATSUSHITA
D1	S1ZB10	BRIDGE DIODE	SINDENGEN
D3	MA157	DIODE	MATSUSHITA TK-1280E
D4	MA157	DIODE	MATSUSHITA TK-1280E
D5	MA157	DIODE	MATSUSHITA
D6	MA157	DIODE	MATSUSHITA
D7	MA157	DIODE	MATSUSHITA
D8	MA157	DIODE	MATSUSHITA
D9	MA157	DIODE	MATSUSHITA
D10	MA157	DIODE	MATSUSHITA
D11	MA157	DIODE	MATSUSHITA
LD1	SEL2310G	LED(GREEN)	
R1	NRSA02J-102	M.G.RESISTOR	1.0K 1/10W
R2	NRSA02J-680	M.G.RESISTOR	68 1/10W TK-1280E
R3	NRSA02J-680	M.G.RESISTOR	68 1/10W TK-1280E
R4	NRSA02J-680	M.G.RESISTOR	68 1/10W
R5	NRSA02J-272	M.G.RESISTOR	2.7K 1/10W
R6	NRSA02J-223	M.G.RESISTOR	22K 1/10W
R7	NRSA02J-563	M.G.RESISTOR	56K 1/10W
R8	NRSA02J-820	M.G.RESISTOR	82 1/10W
R9	NRSA02J-104	M.G.RESISTOR	100K 1/10W
R10	QRZ0098-1R0	W.RESISTOR	1
R11	NRSA02J-564	M.G.RESISTOR	560K 1/10W
R12	NRSA02J-564	M.G.RESISTOR	560K 1/10W
C1	QER40JM-107	E.CAPACITOR	100 6.3V
C2	NCB21EK-104	CER.CAPACITOR	0.10 25V
C3	NCB21EK-104	CER.CAPACITOR	0.10 25V
C4	NCB21EK-104	CER.CAPACITOR	0.10 25V
C5	NCB21EK-104	CER.CAPACITOR	0.10 25V
C6	NCB21HK-103	CER.CAPACITOR	0.010 50V
C7	NCB21HK-103	CER.CAPACITOR	0.010 50V
C8	NCB21HK-473	CER.CAPACITOR	0.047 50V
C9	NCB21HK-473	CER.CAPACITOR	0.047 50V
C10	NCB21HK-473	CER.CAPACITOR	0.047 50V
C11	NCB21HK-473	CER.CAPACITOR	0.047 50V
CN9	CHB102W-22R	CONNECTOR	22PIN
TP1	SSV1096-001	TEST POINT	
TP2	SSV1096-001	TEST POINT	
TP3	SSV1096-001	TEST POINT	
FC1	YU40832	FUSE CLIP	
FC2	YU40832	FUSE CLIP	
△ F1	QMF51E2-1R0S	FUSE	1A 250V

● MOTHER board assembly list 07
 SCK2336-01-P0A
 (TK-1280E/1281EG/1180E)

07□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	UPC358G	I.C.(M)	NEC
IC2	AN8002M	I.C.(M)	MATSUSHITA
Q1	2SB956(ST)	TRANSISTOR	MATSUSHITA
Q2	2SB956(ST)	TRANSISTOR	MATSUSHITA
R1	NRSA02J-332	M.G.RESISTOR	3.3K 1/10W
R2	NRSA02J-102	M.G.RESISTOR	1.0K 1/10W
R3	NRSA02J-563	M.G.RESISTOR	56K 1/10W
R4	NRSA02J-223	M.G.RESISTOR	22K 1/10W
R5	NRVA02D-4701	M.F.RESISTOR	47 1/10W
R6	NRVA02D-5601	M.F.RESISTOR	56 1/10W
R7	NRSA02J-332	M.G.RESISTOR	3.3K 1/10W
R8	NRSA02J-102	M.G.RESISTOR	1.0K 1/10W
R9	NRSA02J-563	M.G.RESISTOR	56K 1/10W
R10	NRSA02J-222	M.G.RESISTOR	2.2K 1/10W
R11	CEVP005-471	TRIM.RESISTOR	470 5V.ADJ
R12	NRSA02J-182	M.G.RESISTOR	1.8K 1/10W
R14	NRSA02J-0R0	M.G.RESISTOR	0 1/10W
R15	NRSA02J-0R0	M.G.RESISTOR	0 1/10W
R16	NRSA02J-102	M.G.RESISTOR	1.0K 1/10W
C2	QEHA1EM-227	E.CAPACITOR	220 25V
C3	QEHA1EM-227	E.CAPACITOR	220 25V
C4	QEHA1EM-227	E.CAPACITOR	220 25V
C5	QEHA1EM-227	E.CAPACITOR	220 25V
C6	NCB21HK-473	CER.CAPACITOR	0.047 50V
C7	NCB21HK-473	CER.CAPACITOR	0.047 50V
C8	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C10	NEE11CM-226	TAN.CAPACITOR	22 16V
C11	NCB21HK-473	CER.CAPACITOR	0.047 50V
C12	NEE21CM-105	TAN.CAPACITOR	1.0 16V
C14	NEE11CM-226	TAN.CAPACITOR	22 16V
C15	NCB21HK-473	CER.CAPACITOR	0.047 50V
CN1	CHB102W-24P	CONNECTOR	24PIN
CN2	CHB102W-24P	CONNECTOR	24PIN
CN3	CHB102W-18P	CONNECTOR	18PIN
CN4	CHB102W-18P	CONNECTOR	18PIN
CN5	CHB102W-24P	CONNECTOR	24PIN
CN6	CHB102W-24P	CONNECTOR	24PIN
CN7	CHB102W-24P	CONNECTOR	24PIN
CN8	CHB102W-24P	CONNECTOR	24PIN
CN9	CHB102W-22P	CONNECTOR	22PIN
CP1	ICP-F10	I.C.PROTECTOR	

● CONNECTOR board assembly list 08
 SCK2341-03-40A (TK-1281EG)

08□□□□□□

Symbol No.	Part No.	Part Name	Description
CN9	CHB102W-22R	CONNECTOR	22PIN
CN13	SCV1770-015	CONNECTOR	15PIN
CN15	SCV1770-005	CONNECTOR	5PIN

● TERMINAL board assembly list 09

SCK2341-02-40A (TK-1281EG)

09□□□□□□

Symbol No.	Part No.	Part Name	Description
Q1	2SC2778(BC)	TRANSISTOR	MATSUSHITA
D3	MA157	DIODE	MATSUSHITA
D4	MA157	DIODE	MATSUSHITA
D5	MA157	DIODE	MATSUSHITA
D6	MA157	DIODE	MATSUSHITA
D7	MA157	DIODE	MATSUSHITA
D8	MA157	DIODE	MATSUSHITA
D9	MA157	DIODE	MATSUSHITA
D10	MA157	DIODE	MATSUSHITA
D11	MA157	DIODE	MATSUSHITA
LD1	SEL2310G	LED(GREEN)	
R1	NRSA02J-102	M.G.RESISTOR	1.0K 1/10W
R2	NRSA02J-680	M.G.RESISTOR	68 1/10W
R3	NRSA02J-680	M.G.RESISTOR	68 1/10W
R4	NRSA02J-680	M.G.RESISTOR	68 1/10W
R5	NRSA02J-272	M.G.RESISTOR	2.7K 1/10W
R6	NRSA02J-223	M.G.RESISTOR	22K 1/10W
R7	NRSA02J-563	M.G.RESISTOR	56K 1/10W
R8	NRSA02J-820	M.G.RESISTOR	82 1/10W
C1	NEA10JM-107	E.CAPACITOR	100 6.3V
CN13	SCV1770-015	CONNECTOR	15PIN
TP1	SSV1096-001	TEST POINT	
TP2	SSV1096-001	TEST POINT	
TP3	SSV1096-001	TEST POINT	

● POWER board assembly list 10

SCK2341-01-40A (TK-1281EG)

10□□□□□□

Symbol No.	Part No.	Part Name	Description
D1	S1ZB10	BRIDGE DIODE	SINDENGEN
R9	NRSA02J-104	M.G.RESISTOR	100K 1/10W
R10	QRZ0098-1R0	W.RESISTOR	1 2W
R11	NRSA02J-564	M.G.RESISTOR	560K 1/10W
R12	NRSA02J-564	M.G.RESISTOR	560K 1/10W
C2	NCB21EK-104	CER.CAPACITOR	0.10 25V
C3	NCB21EK-104	CER.CAPACITOR	0.10 25V
C4	NCB21EK-104	CER.CAPACITOR	0.10 25V
C5	NCB21EK-104	CER.CAPACITOR	0.10 25V
C10	NCB21HK-473	CER.CAPACITOR	0.047 50V
C11	NCB21HK-473	CER.CAPACITOR	0.047 50V
C14	NCB21HK-103	CER.CAPACITOR	0.010 50V
C15	NCF21HZ-104	CER.CAPACITOR	0.10 50V
△ CN14	SCV1752-002	CONNECTOR	2PIN
CN15	SCV1770-005	CONNECTOR	5PIN
FC1	YU40832	FUSE CLIP	for F1
FC2	YU40832	FUSE CLIP	for F1
△ F1	QMF51A2-R08	FUSE	T80mA 250V